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Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

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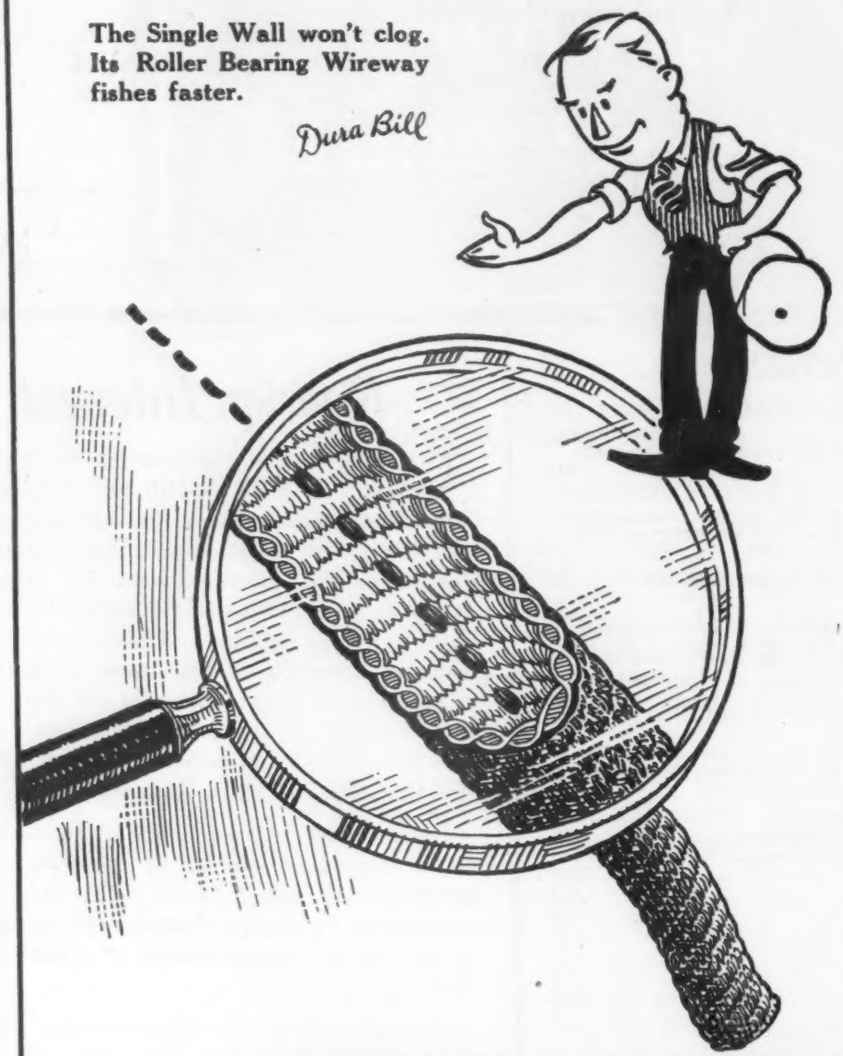

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EDITORIAL

Water and Power Act Has No Bearing on Colorado River

STATEMENTS to the effect that the proposed California Water and Power Act would insure the construction of the Boulder Canyon project will have little bearing with the voters of southern California at the coming November election. The action of the president of the Boulder Dam Association in denouncing the Water and Power Act has laid to rest the fictitious claims of the proponents of this measure. Because the Colorado River question is first and foremost in the minds of many residents of southern California, the sponsors of the act permitted the impression to become general that a vote for this amendment to the constitution was a vote for early development of the Colorado River. This false impression made the securing of the signatures necessary to put the measure on the ballot comparatively easy. It had been hoped, so it is said, that the same false impression would bring many votes. The action of the Boulder Dam Association in enlightening the voting public is commendable. The proponents of the water and power act will have to seek a new brand of political red fire if they hope to save the measure from an even worse defeat than it has met at the last two elections.

By What Yardstick Is Service Measured?

POLICE departments have been criticized, and justly so, when they have based the measurement of their efficiency upon the number of arrests made rather than upon the actual peace of the community. In a like manner there has been a tendency at times in public-utility relationships with the public to gage the quality of service rendered upon the basis of complaints received. If there were many complaints, the service was bad. If there were no complaints, it must follow that the service was excellent.

Yet by no such simple yardstick as this is service to be measured. It would be decidedly easier to render good service if this were all that was required. A list of complaints is a tangible thing. It can be dealt with. Unfortunately, however, it is not upon such visible measurement that the public utility should depend to ascertain the quality of its service.

What criterion is there, then, by which satisfactory service may be judged, or must it always be a matter of probability, of guesswork? It may safely be said that service from which many complaints are received is undoubtedly poor. And in the absence of complaints it is equally safe to assume that the service rendered is at least fair, or to be more conservative, is tolerable.

By these calibrations of the scale of service one may go on to assume really good service to be something just beyond either of the foregoing, something more than mere lack of complaints—which may be lacking only from sheer disgust and a feeling of futility resulting from experience with previous complaints for which nothing satisfactory has been done. If bad service is indicated by vocal expression, and tolerable or adequately fair service is expressed by silence, then it is reasonable to assume that good service, excellent service, is that which, on the other swing of the pendulum, brings forth vocal expression also, but expression of a positive rather than a negative nature.

Really good service is that service, therefore, which is being sung upon every tongue in the community in which it thrives. It is service which is its own best advertisement, for everyone receiving it voices his appreciation of it. Just as poor service brings protest as a natural consequence, so good service evokes commendation spontaneously.

How shall that type of service be achieved? That is another story, one which will bear more searching inquiry. But in this instance is it not well to determine the standard by which good service shall be gaged, so that in future efforts to attain it some definite idea of just how successful those efforts prove may be ascertainable?

Localizing the Power Company in Individual Towns

CONSOLIDATIONS and concentrations make for efficiency it is true, but how often at the price of personal interest. From an engineering standpoint it is sound policy to generate power at a few central stations and to distribute to far sections over an expanding network. Following the engineering plan, business organizations handling such power distribution have been prone similarly to concentrate responsibility in business central stations, with mere routine detail handled in the field through persons corresponding to the secondary distribution circuits.

Theoretically, and as far as it goes, that plan is good. Yet it fails to take into proper engineering consideration one variable factor, namely, human nature. Human nature is individualistic. Human beings have pride, loyalty, and individuality, all commendable qualities and necessary. They dislike and are suspicious of mass activity, especially if it is in some other town than that in which they live.

It is politic, even if it is less theoretically efficient,

therefore, that as little centralization, as affects personal contacts, be effected as possible. The home town likes to feel that it is important. It likes to be considered necessary to the organization. It likes to have a "say" now and then. It wants some of the trade of the organizations which serve it.

As a result, that which may seem to be wasteful nonsense from a general theoretical standpoint—the purchasing of some of its supplies from the small town dealers, for instance— may prove in the end to be the best engineering after all. At least it will be engineering which takes into account one important factor, the factor upon which much of the future of any enterprise must rest—human nature.

A New Problem in Servicing Electric Ranges

"SHALL the power company service ranges sold by department and furniture stores?", asks the manager of the commercial department of one of the large Western central stations. The question was asked following the visit of the manager of a large department store during which the announcement was made that the store had taken over the distribution of a certain range and assumed that the power company would service all ranges sold on the same basis as it serviced ranges sold by its commercial-department salesmen. In this particular instance the brand of range in question was one which did not have the best record desirable insofar as servicing was concerned.

It would seem that servicing in this case is a job for the central station since it is to its interest to see that the range is kept in operation. However, such a policy has several drawbacks. In the first place, if the power company assumes the servicing, then the department-store salesman can make unlimited statements for the range, answering all of the prospective purchaser's inquiries with the statement, "The power company will take care of that." If the range should prove to be of inferior quality, then the power company may be in the path of a storm for any customer hates the fellow who tells him that he has been a sucker. This, however, is a responsibility which the power company must face. The solution to the problem would seem to involve a close understanding between the company and those on the outside who also are merchandising ranges.

More Bonds Mean More Taxes

IN spite of marked economy in federal government, the cost of local government continues to mount at an alarming rate. This is borne out by recent figures which show that the total bonded indebtedness of all forms of government in California now has reached the astounding figure of $609,549,227 as of June 30, 1926. This is an increase over the last fiscal year of $76,349,976 and represents an increase of 549 per cent over the total bonds issued prior to 1911. According to California's state controller, the present bonded debt represents 10.5 per cent of the total assessed value of non-operative property in the state. Since 1911 the assessed value of non-operative property has increased only 160 per cent. The per capita bonded indebtedness increased from 1912 to 1926 290 per cent. Cities are shown to have had the smallest percentage increase since 1911, namely, 331 per cent. During the same period the bonded debt of counties increased 905 per cent and of the state 1,650 per cent. Bonded indebtedness is increasing at an accelerated rate, for during the past four years the average has been approximately $46,000,000 per year.

Primarily this does not affect the electric light and power companies of the state directly since public utilities are subject to a state tax of 7½ per cent of their gross earnings and in some cases a county or city franchise tax of 2 per cent of their gross. This can be changed only by legislative action. However, should bonded debt increase to a point where the tax burden becomes too great for the public it is conceivable that this method of taxation might be changed. Of more direct importance is the fact that this debt is being carried to a great extent by private industry. Since the success of the utilities themselves and the state as a whole is dependent in a large measure upon the success of industry, increases in tax rates or assessed valuation cannot be brooked. Any further increase in bonded indebtedness cannot help but affect industry adversely.

Nor is California the only state which is pawning its future. The same condition holds for practically every one of the Western states. The issuance of tax-free bonds is a prevalent disease. A distinct reversal of public policy is needed if private industry is not to be curtailed and the future of the state impaired.

An Ounce of Prevention

WITH all due respect to General Goethals, the Panama Canal never would have been built had it not been for the success of Colonel Gorgas in stamping out the sources from which the yellow fever mosquito sprang. In fact, disease prevention has made more progress by far than disease cure. Attack a problem at its source if you want to solve it, whether you are trying to rid a tropical locality of yellow fever, or trying to bring about higher standards of adequacy in house-wiring.

What is the source from which house-wiring standards emanate? Obviously, it is the architect and builder. Of all the homes that are erected only a small percentage are built from plans drawn by architects. The architect figures in the larger, more elaborate homes, ranging in price from $15,000 and upward. There are probably 50 to 100 homes in the price class of $10,000 and less to every one above that figure. Enter the realtor who opens tracts and builds large groups of comparatively moderately priced homes for re-sale almost entirely

on the installment plan. The purchaser of a ready-made home knows little and cares less about how his house is wired. Taken for granted that he will have electric lights, he is concerned only with what he can actually see—the hardwood floors, the attractive mantel, the two-car garage, the breakfast nook and the white tiled bathroom. Then he signs on the dotted line and does not realize until some time afterward that, inspired with the electric cooking and heating idea, he must assume a cost of $75 or more for changes in his house-wiring in order to make possible the use of these desirable and convenient electric servants.

A consumer demand must be created for adequate house-wiring. Only in this way can the builder and realtor be induced to bring their wiring specifications up to proper standards of adequacy from the low standards based almost solely upon first cost. The buyer will get what he wants. Now, he doesn't want it hard enough to ask for it, simply because he doesn't know about it. He must be educated, not spasmodically but continuously, even though it may take years to get the message across. It will pay the industry handsomely in the end.

Cooking and Heating as Load-Builders

NO industrial executive today seriously doubts the advantages of electrification. That idea has taken root and from now on will grow of its own intrinsic usefulness. Development of motor load, therefore, is not the problem that it once was.

Still it is from domestic consumers that the bulk of revenue comes, and it is from this group that great increases in load must be built. Industry has become electrified almost of its own momentum. The home is becoming electrified more slowly. Of domestic load-builders, the range, water and air heater are the appliances of major import as yet.

Few executives will grant that all of the problems incident to the sale of these appliances have been solved. There are even those who will not admit that this load is desirable.

Just how important this cooking and heating load on domestic lines may become in ironing out demand irregularities has been summed up admirably by E. F. Perkins in the paper found elsewhere in these pages. This comprehensive study of range characteristics and its constructive selling ideas make it a contribution of considerable worth to an industry whose great problem is that of load-building.

Sales Managers and the "Great Open Spaces"

MOVIE addicts throughout the United States are accustomed to the characterization of the West as "The Great Open Spaces." This interesting little bit of descriptive matter does not seem to have percolated through the cranium of the average sales manager to any marked extent, however. It is not at all unusual, unfortunately, for an Eastern sales manager to appoint a Pacific Coast district representative with headquarters in San Francisco and expect him to cover a territory representing 40 per cent of the area of the United States all by himself, obviously a physical impossibility to anybody familiar with Western conditions and Western distances.

Under the best of circumstances, if the district representative should be a superman and be able to bring about jobber-dealer distribution, he will spend most of his days and nights on Pullman cars trying to maintain contact with his customers and keep adjusted the innumerable difficulties and disputes that arise constantly between factory and distributor. If, on the other hand, he is attempting to sell direct, he is obliged to confine his activities to one locality only, which he can watch, cultivate and bring into fruition, rather than attempt to spread himself out over 40 per cent of the area of the United States, run himself to death in the effort, and accomplish practically nothing thereby.

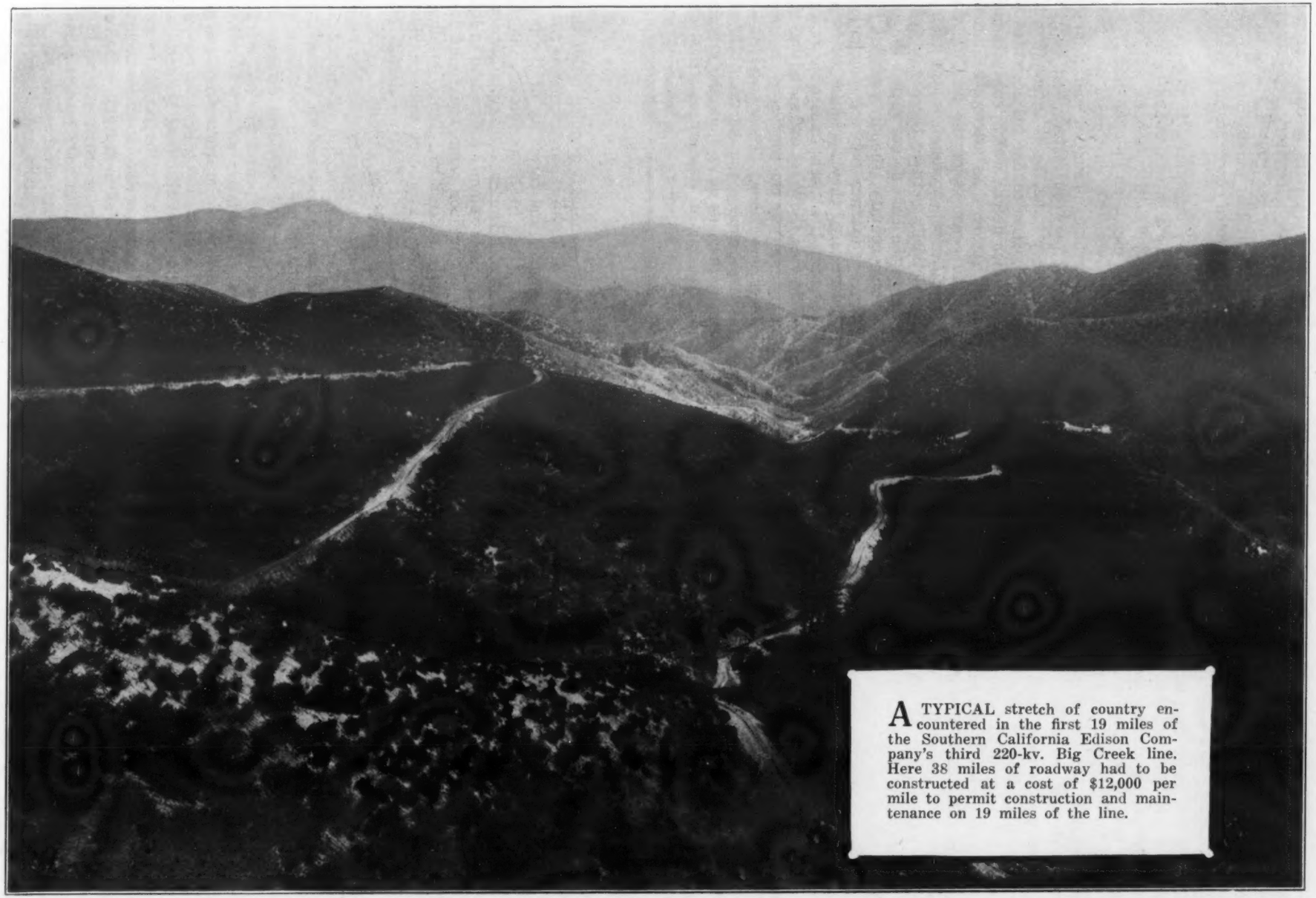
Sales managers in the East do not realize the extent of the Western country, the diversity of its resources, the great distance between population and distribution centers, or they would not set for a lone factory representative such impossible tasks. Rather they should visit the West and spend enough time here to study carefully the conditions entering into local business conditions. Those who do or have done this are reaping the harvest. Those who do not can gather no more than the crumbs that fall from the table of Western electrical development.

Reducing the Cost of Conventions

CONTRARY to the seemingly popular belief that the conventions of technical organizations must be held in the splendor and formality of the best hotels of the larger cities to insure success, the reverse has been proved. The Saskatchewan Section, A.I.E.E., held its regular summer convention in the simple setting of an outdoor camp and found the experiment eminently successful. Tents, bedding, electric lights, water and sanitation were provided at the nominal total cost of but two dollars per adult; no charge was made for children.

Advantages derived from this camp meeting were: low cost, the ease of obtaining full attendance at convention sessions, development of an atmosphere of goodfellowship, attendance of men with families, and a strong appeal to the individual delegate to whom normal convention expenses are not attractive. The efficacy of this latter point was proved by the attendance of men who drove from 200 to 400 miles to attend.

Instead of arranging conventions at the most expensive hostelries and with all the pomp, flourish and formality historically ascribed to ancient courts, it might be a wholesome idea to accept a hint from the above and revert to simpler environment. If, in so doing, convention activities were made available to the so-called lesser lights of the industry, far greater good undoubtedly would result and at a negligible sacrifice, if any.



A TYPICAL stretch of country encountered in the first 19 miles of the Southern California Edison Company's third 220-kv. Big Creek line. Here 38 miles of roadway had to be constructed at a cost of $12,000 per mile to permit construction and maintenance on 19 miles of the line.

Value of the Cooking and Heating Load to the Electric Service Company

By E. F. Perkins*

Pacific Gas and Electric Company, San Francisco

LOAD-BUILDING upon existing lines has been recognized as the big task confronting public service companies, now that the largest of their engineering problems have been met. To iron out the load curve and build up business on residential lines where the greatest opportunity lies, the range, water heater and air heater are advocated in this thoroughly comprehensive paper. A searching analysis and constructive suggestions are contained in this survey of the situation.

THERE are two questions which have been prominently confronting the electric public utilities. These questions are: (1) What is the value of the cooking and heating load to the electric service company? (2) What is the position that should be taken by the electric service company in the merchandising of these appliances?

J. E. Davidson, president of the National Electric Light Association during the year which has just been completed, recently made a statement in reply to the following question, "Why is it that only 50 per cent of the light and power companies merchandise electrical appliances?" A part of his reply was, "It is my personal opinion that companies which do not use every means and method in doing this are not fulfilling their franchise obligations."

A new era has come, and the utilities no longer can look to new extensions to supply a good part of the future growth. They must now face the problem of exerting greater energy towards the increasing of loads and consumption on existing facilities. In order to load existing facilities, electric energy-consuming devices must be sold. During the past five years a great many utilities have been building up this appliance load and the next five years of merchandising activity will be determined in a large measure by the success and experience of the past five years.

If these engineers who made our territory stand out in the electrical world are to continue their aggressive activities, then we must have sales executives of the same indomitable spirit, courage, energy and vision, who will develop an outlet for this energy.

By the same kind of methods that our engineers employ, sales managers should determine by an analysis of lines, load curves, operating charts, diversity and demand, which appliances will tie in to the best advantage with the system and then overcome all obstacles to see that these are placed on the lines of their companies.

What do we mean when we say electric service company merchandising? Do we mean that an electric service company must sell every known electrical device in order to be considered as merchandising? A strict analysis of the word would lead us to believe that any firm in business which buys and sells any manufactured product to the public is merchandising. Then any electric service company which decides that it desires to build up its load of any specific appliances by direct sales is merchandising. It is good business on the part of the electric service company to analyze the field of appliances and concentrate its efforts on those particular appliances which build a desirable load and on which there is little or no effort being placed by other merchandisers.

Assuming then that a large part of the future growth on the part of the electric service company must come from the loading of existing facilities, we have only to refer to reliable statistics and we shall find that 80 per cent of all electric consumers are domestic consumers. Let us then analyze the load of these 80 per cent of our consumers.

Figure 1 represents, as perhaps you recognize, an electric meter. This meter is installed in a home where electricity is used for lighting only. The average revenue from lighting is approximately $26 a year. An electric range is installed in the home. The average revenue has increased $54.60, and the total revenue has increased over 200 per cent. An electric water heater next is installed. The annual revenue increases $53.16. The total revenue has increased more than 400 per cent. A 3-kw. electric air heater is installed next. The annual revenue increases $36. In all the revenue has increased 553 per cent in this home.

This pictures the vast opportunities which exist on the present lines awaiting development.

The electric light and power companies should be in business to sell electric energy-consuming devices and supply the kilowatt-hours. The important factor to be investigated then appears to be a study

* Report of the electric cooking and heating committee of the Commercial Section, Pacific Coast Electrical Association, presented at the annual convention June 9, at Los Angeles, Calif.

of this load from a distribution and operation standpoint. The following charts show an analysis of typical loads:

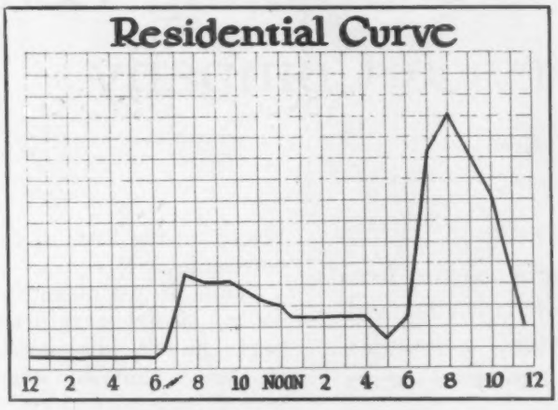


CHART 1.

Shows the load as recorded on a primary distribution circuit, which is made up principally of residential load, with scattered commercial houses and small motors. This curve shows that this line is practically idle except for a period of about three hours during the evening of each day. There is certainly an excellent opportunity for loading existing facilities and filling the valley on this line.

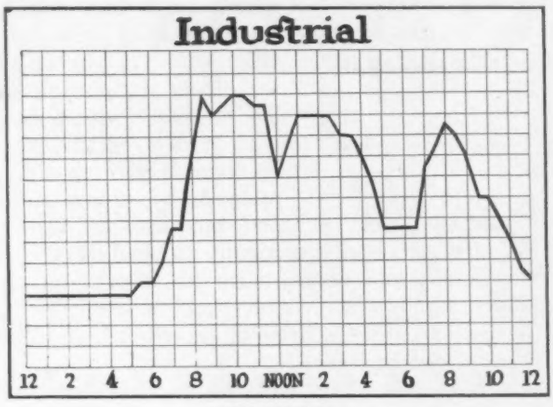


CHART 2.

Showing the load on a circuit in an industrial district to observe what would be the result in the over-all of an increased heating and cooking load in the residential section. This curve shows that there are two peaks, one from 8:15 a.m. to 11:15 a.m., the second from 1 p.m. to 4 p.m.

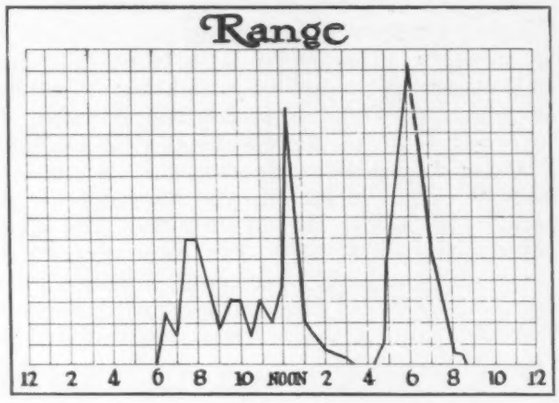


CHART 3.

This chart was obtained from a report of the electric range survey committee of the N.E.L.A., as conducted by the Northwest section. It shows that the electric range morning load decreases as the industrial load comes on, also that the noon cooking load increases and decreases, respectively, as the industrial load goes off and comes on and that the evening load decreases as the lighting peak comes on.

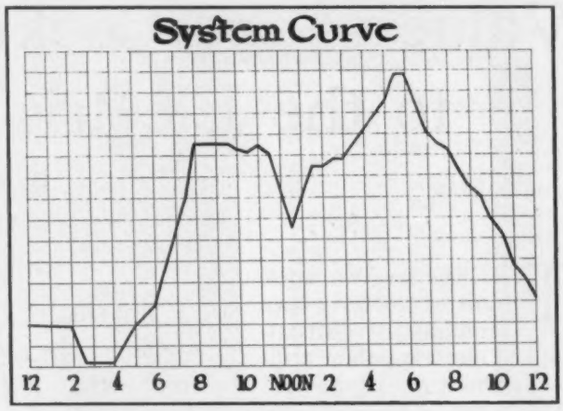


CHART 4.

This is a load curve for a complete system, with as near a maximum peak of lighting as could be obtained. From this curve it is evident that the evening cooking load in some sections during the winter is going to come at practically the same time as the lighting peak. I am convinced, however, that this is not a serious condition due to the fact that there are a great number of electric plants from which an output can be obtained for a short time, far exceeding the maximum demand at the present time. We also have a diversity in the evening cooking peak due to the fact that evening cooking varies over a system and depends upon the living conditions of its customers.

For instance, in the country territory the cooking load will come on early in the morning and earlier in the evening than in the city territory. The same condition will apply in industrial centers, so that an over-all curve of all cooking consumers will be much broader than the chart that is shown here covering ten electric ranges, all operating in the same district where the living conditions are identical. Electric air-heating and electric water-heating will tend to fill up the valleys which now exist when considering electric cooking only.

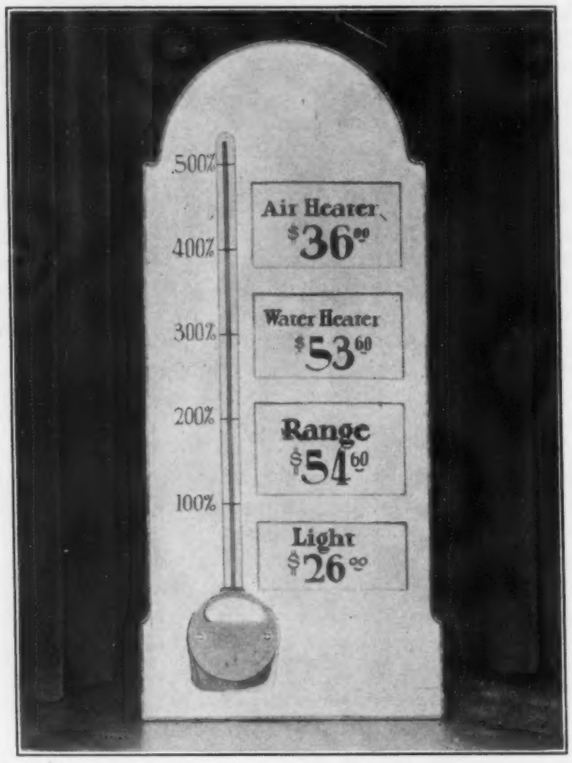


Fig. 1. An electric meter—showing the approximate revenue from lighting only, from an electric range, a water heater, and an air heater, and the percentage of increase from each

There is a lack of information regarding the operating characteristics of the electric air-heating load. Through the National Electric Light Association arrangements are being made for an extensive test to be conducted by the Pacific Coast Electrical Association which will be similar to the range test just completed by the Northwest section and which will have as its first aim the obtaining of all statistics relative to the operation of electric water heaters on metered rates. During the time this test is conducted it is hoped that we will be able to obtain definite information regarding electric air-heating. It is anticipated that this test will show that electric air-heating will have a peak preceding 8 a.m. when the industrial load comes on and that it will taper off throughout the day. This will be caused because the home is cold in the morning with the greatest amount of energy being consumed during the earlier morning hours, and there will be a large diversity during the day.

It would appear that from a financial standpoint the problem of the electric service company is the improvement of the load factor on each separate distribution circuit. By doing this the system load factor will be improved. Is it good business or economy to permit a distribution circuit to exist with a load factor that may be as low as 15 without making a very strenuous effort to improve it, especially when there are appliances which can be placed on these lines by aggressive sales activities that will improve this load factor?

The outstanding facts brought to light by the domestic cooking committee this year was the fact that nine homes were wired for electric service to every one electric range which was sold during the year 1925. This disregards altogether the hundreds of thousands of homes already wired for lighting service which are using only a minimum or an amount of electricity slightly above minimum per month. It is also a fact that the saturation of electric ranges is only 2.3 per cent. It is very apparent that the saturation point of electric ranges is away off infinity. Consider also that 80 per cent of the electric services is to residential consumers and that we are receiving approximately 20 per cent of the possible revenue that can be obtained in this class of service.

You have before you in these residential consumers, gold mines laying dormant awaiting development. Recognizing the importance of this load to the electric service company, the next problem is the question of merchandising policy.

Time does not permit a discussion of this subject of merchandising policy, but there are, however, two points which I would like to discuss. The first is the resale price of appliances. The resale price should be one which will permit any merchandising firm to participate in this business. Any deviation from recognized business ethics in this regard is an admission of weakness and should not be tolerated. Special sales, however, are recognized as good business and should be conducted at various times with special prices for a limited period, not only to stimulate buying but also to stimulate the sales force.

The merchandising department should have a financial set-up whereby the business obtained can be measured. A definite value should be set and credited to this department for the new business obtained, this amount to come out of the revenue earned by each sale. In this way we can measure results by definite merchandising standards. Remember, however, that there is one element, time, which is required in perfecting any policy.

The second point is the question of sales organization. In building up a sales organization it is impossible to go out into the open market and obtain a group of salesmen who immediately will become productive to the complete satisfaction of the electric service company. In my mind, the salesman to represent the electric service company as a rule is an employee in your own organization. It is merely a matter of picking the right man for the job. Remember, however, to train a salesman is not a job that can be accomplished over night; it will take on an average of one year to train a salesman so that he can do justice to his work.

While it is possible to pick good men from outside sources it appears that the most satisfactory results are obtained from salesmen who have been picked for their jobs from other departments, men who are familiar with company policy and routine and have the interest of the company at heart. These are qualifications that have been built up through perhaps years of service to the company and qualifications which you cannot hope to obtain from men who have had sales experience with other companies or other lines.

Let us now consider the position that should be taken by the electric service company in the merchandising of these appliances.

It appears that, inasmuch as a great many of our consumers enter our office only when they make their original application for service, we are overlooking the most wonderful opportunity which could be presented to us when we fail in some way to advise them of the many important servants that can be placed in their hands to aid them in the performance of their daily tasks, and in this way also impress them with our desire to be of service in reality and not in name only.

Recently I have perfected an imaginary invention. This invention provides for a very comfortable chair in which all prospective customers for electric service must be seated before the business at hand is started. The man representing the company will find out what applications of electricity the customer proposes to make in her home. He will then, in a very few words, obtain the interest of the customer by touching briefly on some new application of electricity for her particular use and upon obtaining her attention will press a little button located under his desk and the customer will be lowered very gently through the floor into a very attractive display room of all known electric devices. The customer will be permitted to observe this room of appliances for a moment and will perhaps notice that the room is enclosed completely except for an exit which can be reached after climbing seven

steps. These steps are most important in all sales work and represent the seven steps that must be taken by our customers to realize fully the service that can be rendered by the various electric appliances.

Fig. 2. The seven steps of salesmanship.

A salesman of pleasing manners will approach the customer and carefully lead the customer up these stairs by a presentation of the electrical servants. These steps are:

1. Approach

You have had a salesman approach you and by some untactful remark antagonize you toward him and the firm he represents. Favorable attention or approach therefore generally is determined by the friendly and pleasing impression left by all employees of the company who may have had dealings with our prospect. Approach in this specific instance is a courteous and tactful opening of the subject with our prospect. The second step is:

II. Interest

We must have the interest of the prospect or we cannot continue with the sale. It is very easy to determine when we have obtained this interest inasmuch as it will be reflected very definitely by the attitude of our customer. Upon being sure that we have obtained the interest we will proceed to the third step, which is:

III. Appreciation of Value

Our prospect now must be impressed with an appreciation of the value of the appliance. We cannot hope to proceed further until we are convinced that there is an appreciation of value, and at the same time we still have far to go. The next step is:

IV. Desire to Possess

We are reaching now the most difficult part of our task, and the salesman is being put to the real test. A desire to possess may be created by representing the specific appliance as being used by the prospect and assisting her in her tasks. A desire to possess does not mean that she is going to buy. She must proceed to the next step, which is:

V. A Decision to Possess

All prospects are prone to put this decision off, and it requires real sales ability to influence this decision and to pass on to the next step, which is:

VI. Action

Where the decision to possess is capitalized, this deals with the final details from the quoting of prices and terms to the closing of the sale with the name on the dotted line.

VII. Satisfaction of Service

The seventh step is **satisfaction of service** that has been rendered, not only from the appliance itself, but from the company.

There is no royal road to salesmanship, and these seven steps are taken by everyone in the making of a purchase.

I next would like to point out a very important reason why you need a strong sales organization in order to build this appliance load.

Where Does the Dollar Go?

Here is a model of the American dollar. I would like to call your attention to this dollar as representing the annual income of an American family. Have you ever stopped to consider where this dollar goes? I have analyzed budgets on the cost of operating homes and arrived at these figures, to which I invite your attention.

Ten per cent of this dollar goes into savings, 20 per cent of this dollar goes for rent, insurance and upkeep of the home, 20 per cent goes for food, 20 per cent for clothes, 10 per cent for advancement, which includes health upkeep, doctor, dentist, recreation, clubs, charity, gifts and the church. Only 20 per cent of the dollar remains, and this 20 per cent is used for fuel, light, laundry, telephone, help, automobile and replacement of obsolete equipment, such as furniture or new furnishings.

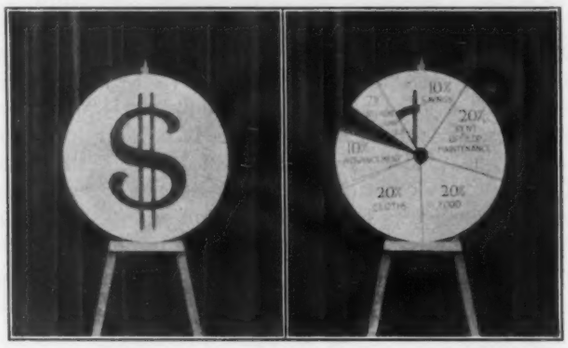


Fig. 3. The American dollar—and how it is divided into the average family expenditures for the year.

This 20 per cent I would like you to consider in two lights. First, that an average of approximately 1 per cent of the 20 is used for light, 5 of the 20 is used for fuel, showing that electricity is obtaining only 20 per cent of its possible revenue that is awaiting it in the home. Six per cent more of this 20 is used for telephone, laundry and help. This leaves 8 per cent of the 20 for replacement of furnishings or new equipment and out of this comes the automobile. You readily can understand then that we, in the sale of electric appliances, are in competition with every other thing that is for sale. You will also perhaps agree that people are more

apt to spend the little money they have for objects which have the pleasure appeal before they will buy objects for utility reasons.

If these figures are correct, and I believe that they are a good average, the average size family with a $250 a month income will have approximately $20 a month which can be expended for upkeep of automobile and purchase of new equipment. You perhaps can readily see the reason why the credit business has grown by such leaps and bounds. It is true that the average person in making a purchase of new equipment is not buying on the basis of the complete purchase, but is buying on the basis of the first down payment. It might be that the article purchased will cost ultimately $250, but if the payment down is 10 per cent they are in reality only making a $25 purchase.

Next, after observing these facts, we desired to know what was being done to sell these appliances to our electric consumers. Here is a copy of the Saturday Evening Post. Go through it page by page and find advertisements covering almost every known object for sale and we do not find a single advertisement calling attention to electric ranges, electric water heaters or electric air heaters.

Next take your Sunday paper. Again we find attractive advertisements but nowhere do we find advertisements on ranges, water heaters or air heaters. There must be a reason for this. The advertising would be there if there were a demand for these appliances which would justify the expenditure. The advertisements which do appear there time after time are undoubtedly justified by purchases.

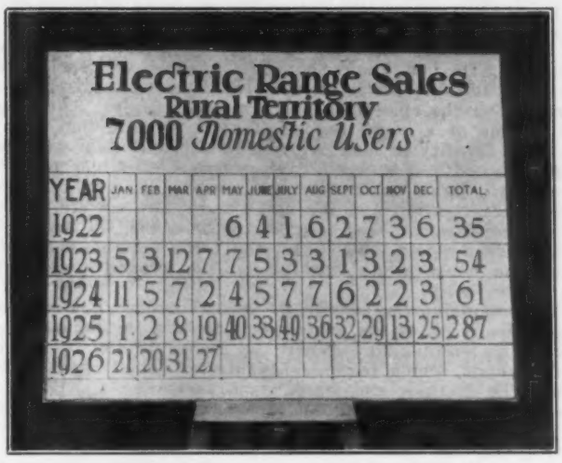


Fig. 4. The number of ranges sold in a particular territory for four years, shown by months.

The electric range, water heater and air heater are in competition then with all these devices which are advertised and all in competition for this small 8 per cent that is left for the family budget. If the electric range, water heater and air heater are to obtain their just share of this 8 per cent, it is necessary that someone come out with sales activities which will offset the competition.

Here are a few figures which I would like to present to show what can be accomplished by central-station merchandising. The tabulation (Fig. 4) shows the number of ranges that were sold in a territory by months for the past four years. You will note that from May 23 to April 25 the sales were practically the same by months. During this period one salesman was covering this territory and, due to its wide extent and other work that he had to do, the results were as shown. In April, 1925, an additional salesman was added and in May still another. The activity of these three men from May 1, 1925, to date has been confined to the sale of electric ranges, water heaters and air heaters. During the period from April 25, 1925, to Jan. 1, 1926, eight times the number of ranges were sold as compared with the same period of 1924, and the sales force was increased only three times. It is also a fact that during the period previous to April, 1925, the sales by electrical dealers in this territory were practically none, while during the period following April 1, 1925, the dealer sales averaged approximately one-third of the ranges sold, or exceeded by nearly double what had been accomplished by all forces previous to 1925. In this territory in which there are 7,000 domestic consumers, 356 electric ranges were sold during the year ending May 1, 1925. This total is 5 per cent of the consumers in the territory. Compare this 5 per cent, if you will, with 2.3 per cent saturation over the territory covered by the P.C.E.A. on Jan. 1, 1926.

Like Results in Electric Air and Water Heater Sales

There is no question but that had the sales activity continued to date as existed previous to April, 1925, the sale of electric ranges would have continued the same. While this tabulation shows only the results in electric range sales, the same results were accomplished in the sale of electric water heaters and electric air heaters.

Another outstanding fact and one that means cold cash is that the revenue received from the heating and cooking accounts during the year from May 1, 1925, to May 1, 1926, was 60 per cent greater than the revenue received from heating and cooking accounts in this same territory during the previous year.

We are justified in expecting that the revenue for the year ending May 1, 1927, again will show the same increase over the revenue received during the year ending May 1, 1926. I can recall example after example which will point to this same conclusion.

I wish only to call your attention to a campaign which recently was conducted in merchandising where the problem was very similar to our own. A campaign of two weeks duration sold more appliances than had been sold previously through regular channels over a period of two and a half years.

A secondary distribution line in a strictly residential section was picked out for analysis. It was found that this line was served from the primary circuit by a total of 50 kw. in transformer capacity. (Fig. 5.) It was found also that this particular secondary line served 175 lighting consumers. The accounts of these particular lighting consumers

were analyzed and it was determined that the annual kw-hr. sales were 65,100. The annual revenue was $4,550. From these figures it was easy to determine that the average consumption per consumer was $26 per year and that the load factor for this particular secondary line was 15 per cent. Here is a line with an investment which is practically idle 85 per cent of the time! Inasmuch as it is impossible to move this line and use this investment where it will give a return during the 85 per cent of the time that it is useless, our problem then is to develop additional load on this line. We will presume, therefore, that over a period of time we can load this line with 44 ranges, 44 water heaters, and 44 3-kw. air heaters in addition to the present lighting load. This is done with no additional bookkeeping to handle these accounts. By further analysis of actual distribution and operating conditions it was determined that on the basis of the load involved that it would require 135 kw. in transformers to serve this load. Remember that this is done with no additional poles or any additional lines to maintain. On this basis then the annual sales would amount to 311,500 kw-hr. and the revenue would be $10,669. Therefore, the average revenue for the 175 consumers has increased from $26 to $60.96, an increase of over 100 per cent with no additional collections to be made. At the same time the load factor has improved by nearly 100 per cent and is now 26 per cent. The results accomplished are more revenue per dollar capital.

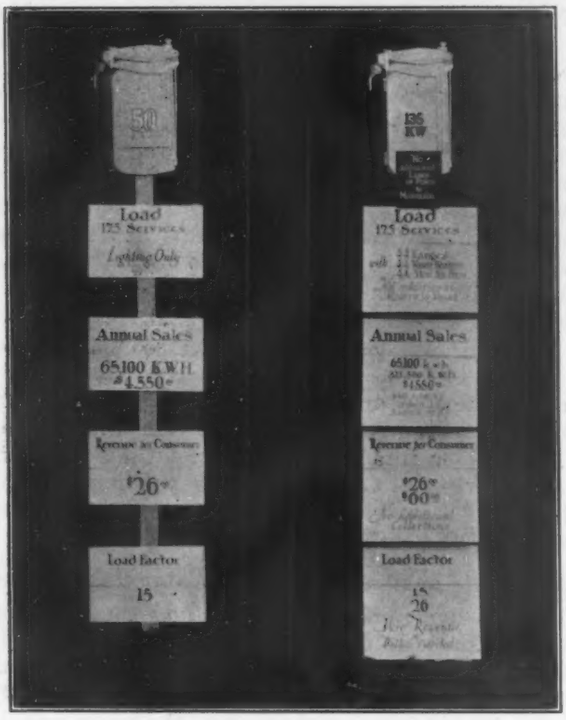


Fig. 5. Representing a pole line serving 175 lighting consumers, and the revenue derived from it—as compared with the revenue possible from the same investment when each of the customers adds range, water and air heater to the line.

Winning Customer-Relations Essay

THE essay writen by DeWitt Scott, power salesman, San Joaquin Light & Power Corporation, was judged the best of all submitted in the contest conducted by the Customer Relations Committee of the Pacific Coast Electrical Association prior to the recent convention of that organization. Mr. Scott's essay follows:

The Proper Treatment of Our Customers

Poles, wires and generators do not in themselves make a public utility. We can pore over the balance sheet, but we must turn to the personnel to find the spirit, life and destiny of the institution. Upon the human element of the organization rests the success or failure of the business. Our corporation is an artificial person, whose personality and character is a composite of the many characteristics of the employees. This fixes our responsibility, as individuals, to uphold and develop our part in this job of creating good will with the public.

Here lies the value of this little booklet, "Proper Treatment of Our Customers." Since the beginning of the industry engineers have made rapid strides in development of better equipment, experts have devised better rates and methods of accounting; in fact, these phases of the industry have received considerable attention while the efficiency of the individual has been perhaps neglected. Now, however, the employee is receiving that which he needs,—expert instruction in matters which mean even more to him than to the people he serves. The instructions in this booklet have added value because of their simplicity. The idea behind customer relations is so broad in its scope that we are apt to overlook detail. I find myself now, among other things, carefully avoiding the phrase "you will have to."

One word which I believe was overlooked is "loyalty." Nothing inspires more confidence in the company than the loyalty of an employee. Those who do not possess this quality are out of place and in justice to themselves and the company should seek other work. . . . Courtesy and affability among the employees is the seed of good customer relations. We are each like a cog in a huge machine and as we mesh in with the fellow next to us kindness and co-operation is like the lubricant applied to the working parts of the machine, lessening the friction, making everyone's job more easy and pleasant yet building up the efficiency of the machine as a whole.

I was suddenly startled, recently, by a harsh voice, exclaiming, "Do you know that YOU nearly set fire to my house?" Looking up from my work I saw a total stranger leaning over the office rail facing me accusingly. I had sudden visions of a house on fire, frantic fighting and now a mistaken identity in me. After a few questions it appeared that the wood had been charred on the side of his house by the electric light wires. He was assured it would receive immediate attention and the name and address were rushed to the line foreman who hurried to the scene. It proved to be blackened spots, caused by the torch of the man who wired the house when working on the ground wire three years previously.

This complaint was caused by what I believe is the cause of practically all of the antagonism against the industry,—a lack of understanding. Where ignorance is found, skepticism prevails, which fosters antagonism. The only cure for this is the facts—plain, frank, open facts. . . . When I meet a man who is antagonistic toward the company, I feel the very remarks he makes are evidences of his lack of knowledge of the true conditions. . . .

The best definition I have ever read of public relations is, "giving the public a square deal, and being sure the public knows it is getting a square deal." Our company is unquestionably doing the first, and our work lies in the latter. We can reach the public through the press and by the spoken word. The former is far-reaching, but lacks the warmth, friendliness and intimancy of the latter and I therefore think one of the most important steps toward better customer relations is the further education of employees in the basic facts of the company. This will inspire confidence which will be imparted with sincerity to all with whom they come in contact.

Is it not up to every one of us to wage a war against misunderstanding? In this way only can friction and enmity be overcome. For in the end we should always remember that, "a thorough understanding means long friendship."

Politics and the Electric Light and Power Industry

By Franklin T. Griffith*

President, Portland Electric Power Company, Portland

OCCASIONALLY a man in high public office, through misinformation and misunderstanding, makes an attack upon the light and power industry. In this article Mr. Griffith draws upon his wide experience in the business to answer such an attack, after appealing to the industry that it consider such expressions of opinion as were made in this case to be based upon honest convictions.

POLITICS, which is simply the administration of the business of all of us as a community, no longer feels the influence of the great political parties as it did in the past. Lack of organization in these parties for the formulation of principles and for declaration in favor of definite public policies has resulted in the growth of other organizations which are doing today exactly what the political parties did in the past. One of the most important of these is the National Grange, representing as it does the development of agricultural interest and the protection of the rights of the farmer. Because there are no other agencies to perform the task this organization has led its membership outside the realm of agriculture into politics, in the sense that political questions are those affecting the great mass of the people as a whole.

A year ago leaders of the electrical industry had the pleasure of listening to the Master of the National Grange at the San Francisco convention of the National Electric Light Association. He spoke in a most friendly way to this industry. He spoke favorably about the need of extension of electric service to all the farms of the country, and he urged the representatives of the electrical industry to take into consideration the rights and aspirations of the farming community to bring to it as rapidly as possible the blessings of electric service. He said that he was not in favor of federal operation, ownership or management. He stated that he believed that the men of the light and power business had the ability, the willingness and the integrity to conduct this business honestly; to treat fairly all men in all walks of life—farmers and city dwellers as well.

Unfortunately the opinions as expressed by the Master of the National Grange do not appear to be true of the state Master in Washington. Before a recent meeting of the Washington Grange this man made a statement which will serve as my text. He said:

> Probably the biggest trust of all times is the power trust. Reaching out with its subsidiary corporations into every state in the Union, its immediate aim is to lay hold on the water power of the nation and set the never-failing streams to pouring gold into its coffers. A little band of congressmen whose chief aim is to serve the people have so far prevented giving the nation's largest power development away, but the fight is far larger than Muscle Shoals. It involves forty million undeveloped horsepower in the nation, a field for exploitation so vast that it dwarfs all others.
>
> Washington has more water power than any other state in the Union, but at the present rate of filings it will soon be turned over to private ownership, corporations who will tax our people for all time to come taking out of this state a steady stream of wealth. There is but one way to protect this heritage and that is through public development. Public supervision has failed, for there are so many devious methods of milking the profits before the public service commission gets in its work that the regulation amounts to very little. The examples of municipal development have proved to all fair-minded citizens that regulation would not hold down rates, and that the only way for the people to enjoy the benefits of this heritage is for them to develop it themselves and distribute it at cost.
>
> The Federal government can do this and should so develop the great power projects which will serve whole states or groups of states. In this state the provisions of our constitution with reference to bonding make state development almost impossible. Our cities are allowed to develop power for their own use, but only the largest can afford to make the investment. It is unfair to deny the people outside of the cities the rights which the people of the cities enjoy. A measure should be enacted enabling the country people to form power districts under which they can enjoy the same rights as the people of our cities, and cities and towns should join into such districts if desired.

I take it that this is an expression of honest opinion, based upon a conviction honestly arrived at and representative of the opinion of many members of that organization.

Now, first, this charge that the power trust, so-called, is reaching out into all the states of the Union to control for its immediate purpose the water powers of the country. We in the electric light and power business know that is not true. The Grange does not.

From a national standpoint the Eastern and Western view of this question is entirely different. It is true that the great bulk of the undeveloped potential water power of the country is west of the Rocky Mountains. But it is equally true that the great bulk of the demand for electrical energy is

* Excerpts from an address before the Northwest Electric Light and Power Association Convention, Spokane, Wash., June 14-17, 1926.

east of the Rocky Mountains. We out here are accustomed to talk so much about water power that we think electric power is produced mostly from this source. That seems to be the idea advanced by the Master of the Washington Grange.

Now what is the fact? Of the fifty million horsepower in stationary engines or units in the country four-fifths are steam. That does not include all of the motive power in locomotives other than stationary power. If all the water powers of the country were developed today the energy resulting therefrom would be insufficient to supply the present demand for power produced by steam.

Steam—coal—fuel is now and for all time, until we change the entire method of production of power, will be the primary source of power in this country, not water power. That will be true from an economic standpoint for the next decade or two decades because, by reason of the fact that the great bulk of our population is east of the Rocky Mountains and the great development there also, the power demand will continue to be far greater in the eastern section of the country than here in the West.

The power development of the future is steam, not hydro. Let us not lose sight of that fact.

There is no purpose on the part of the so-called power trust, which is that loose aggregation of men engaged in the power business, to misrepresent their problems. They do all their business in the open light of day. There is less concealment about the operations of this industry than any other industry in which men are engaged. It is the most rapidly growing industry on earth today. It is growing in the full light of reason. I think this industry agrees that the policy of full publicity in its plans, purposes and methods is the right policy because it is charged with a public obligation and the public has a right to know what it is doing. All developments of this industry are being made for the primary purpose of extending service as a business proposition everywhere that it is practical from an economic standpoint to extend it. To make money, to be sure, but money made reasonably, honestly and limited by law to a reasonable return only upon the actual value of the property devoted to the public service.

What Are Men in Business for?

This "stream of gold that goes into the coffers of the power companies!", how does that differ from the stream of gold going into the pockets of the farmer, the manufacturer or any other kind of business man? What are men in business for? They want to make profits; they want a reward. There is no purpose in business unless there is a profit to be made. Why should the aim of the electrical industry be condemned because it wants to conduct its business for the purpose of making a reasonable profit? Further, when this industry asks a profit it is not asking an unlimited rein to its fancy or imagination, to take advantage of each and every turn in the cycle of business so that it may profit by the distress of others. That can be done and is done in every type of business except public service. Profit in this business is limited by law to a reasonable return. Can anybody object to that?

"By devious methods you may milk the profits before the regulating body gets ahold of it," says my friend. What are these methods? How can they be employed? We know that there is no opportunity for "devious methods" in public service. How many members of the Washington Grange would agree with this pronouncement had they known when they heard it that every dollar of receipts and disbursements is a matter not only for inspection of the Public Service Commission but may be made an absolutely open public record. How many of them know that the public service commissions of the various states have the power to determine by actual appraisement the value of the property devoted to public service, and that we are confined not to a return upon what we think to be the value of the property we are using for the benefit of the public, but to the value determined by the commissions selected for that purpose?

Without Profit the Machine Will Stop

Where is the opportunity by devious methods to create a fictitious value with that power vested in the public service commissions from one end of the country to the other and exercised by them? Every utility has as a rate base only the actual value of the property used and usable in the public service. If that base has been determined, can any man reasonably criticize the right and the duty of operating the property to earn a reasonable profit on that value? In its final analysis that is the criticism advanced by the Master of the Washington State Grange. We want to pour gold into the coffers of the utilities, reasonably. Without profit the machine will stop. Without profit the desire of men to advance will cease. We must have profit to continue. We cannot stand still. There is no such thing as standing still in this business. You retrograde or you advance and the whole history of the industry is that it does advance. To advance it must have a reasonable return.

Again, my friend says "that at the present rate of filings all of these water powers will be gobbled up by the power trust." Disregarding the national aspects of the question and applying it only to the Northwest where there is so much undeveloped water power, this statement is based upon fallacy and a misunderstanding and misapprehension of the actual condition.

It is a constitutional provision in all but four or five states of the Union that the common law of England is the law of the state until and except when expressly abrogated by statute of the state. So it is with the doctrine of riparian rights which dates from the days of the Justinian Code and is the foundation of water laws as we understand them today. This doctrine recognizes that the right to the use of flowing water inured to the owner of riparian land and that that right was to have the water flow as it was wont to flow by nature unpolluted in quality and undiminished in quantity. That common law has been abrogated in the Pacific Coast

states. We have what we call the doctrine of appropriation.

In 1876 the federal government, being the owner at that time of vast areas of land in the thirteen western states, lands upon which numerous streams were flowing, passed what is called the Desert Land Act. Under this measure it is provided that the federal government as a riparian proprietor, as distinguished from its right as a sovereign government, permitted the appropriation of all waters upon the public lands of the United States then owned by the government, excepting so much as might be necessary for domestic use only of the riparian land.

The Theory of Appropriation of Water

Based upon that federal statute the states of the West have developed the theory of appropriation of water. Logically they contended that, if the government divested itself of title to the flowing water, that title then would rest with the states as commonwealths, not as riparian proprietors. So the states of the Northwest have declared that all title to water in running streams, lakes and navigable waters is vested in the state, and have passed appropriation laws under which it is possible to appropriate water for beneficial use.

It is a curious thing not recognized by most of those who discuss water-power development that the right of the state to control the development, appropriation and use of water is only half the story. Eighty-five per cent of all the potential undeveloped water power of the United States is still subject to federal control; not by virtue of the ancient laws of riparian ownership but because in using water for beneficial purposes land must be used in its development. If water is diverted from a stream, or a structure is built in its bed such as a dam, this structure must rest upon land. Then the question of the ownership of the land becomes an important factor.

If any portion of the water that is used, or any portion of the structures that are built for the purpose of developing water, touches federal land, then application must be made to the Federal Power Commission for a permit. Moreover, the Federal Power Commission has absolute power over the granting of permits for the development of water power upon navigable streams wherever they are, whether public lands are involved or not, purely by virtue of the constitution giving Congress the power to regulate commerce between states and therefore the waterways used for this commerce. Thus permits must be secured from the Federal Power Commission if a development is on a navigable stream or if a square foot of federal land is used. So the states today, in passing their laws permitting the appropriation of water power, grant only a portion of the right necessary to make the development complete. The grant of the water right by the state is an empty grant unless there be accompanying it the grant from the higher authority, the federal government.

What possibility of exploitation is there to one securing a permit under the federal law? It is conceded that power development should be made just as rapidly as there is need for it; indeed, following the policy of the progressive companies of the West, in advance of any possible need. Thus the industry always will be ready unless crippled by vicious legislation, to take care of any possible demand for additional service. That is the aim and ambition of every executive of this industry today—at all times to be able to serve to the absolute limit at rates only sufficient to provide a reasonable return upon the money actually invested. Who can object to development on that plan?

When a development is undertaken this industry is compelled to make a full accounting to the Federal Power Commission of the kind and character of the development. Before a spadeful of earth is turned, plans must be submitted to this commission so that it may determine whether these plans are best calculated to utilize to the utmost the latent power we are seeking to appropriate. We cannot be permitted to go ahead and make an improper, imprudent or unwise development. Further, a report of every dollar of expenditure must be made so that the federal government at all times in the future will know exactly what the development has cost the permitee or licensee.

The federal government grants a license for fifty years with a right to a renewal at the expiration of that time from year to year, provided it does not desire at that time to take over the development itself. It may have the power—and we submit to that when the contract is signed—to take the development from us, with all the necessary appurtenances to make it a going concern, at cost less depreciation.

Drastic Conditions Imposed by Federal Power Act

The Federal Power Commission has the right, if the states in which the development is made fail to exercise their authority to regulate rates as between various classes of consumers, to determine the reasonableness of rates for the public use. Further if by any chance, there be an exorbitant profit secured by the development, there is a provision in the Federal Power Commission Act that there shall be an expropriation of that excess profit and the government may reduce the valuation of the whole project by such an amount as has been received in excess of a reasonable rate of return. Indeed, it requires courage of a very high order for men engaged in the light and power business to accept the provisions of the federal law. It is only because we as a class of men have confidence in the fairness of our own nation that we are willing to submit to the drastic conditions imposed upon us.

Where, then, is there an opportunity to exploit the public? If exploitation in the mind of the Master of Washington Grange means receiving an exorbitant rate for the class of service furnished and making an undue and unreasonable profit, how can it be done? There is so much opportunity in this business for good to the whole mass of the people, if we could devote our minds and our thoughts and our talents to the development of this industry, to the extension of our services, to

the steady cheapening of the cost, instead of combating such unreasonable attacks as the one under discussion here.

The Facts About the Ontario Experiment

The granges of Oregon and Washington are advocating public development of water power, but their primary purpose in the beginning was the extension of electric service to the farm. Recently there has grown up among the farming element generally and among the granges a belief that in Ontario, Canada, there has been a wonderfully successful experiment conducted under public ownership which has resulted in untold advantage and prosperity to the farming community. They say, "We want what has been done in Ontario here in Oregon and Washington. If the electric light and power business does not give it to us, we as a body politic representing the people are going to combine our resources to make these developments and carry lines out over the country so that every farm will be lighted by electric energy."

How many of them know the facts? How many know that the National Electric Light Association has made a complete report of the Ontario situation? In addition, there has been a recent report by a committee in Minnesota charged with finding out the truth. In the province of Ontario 2.52 per cent of all the farms now are receiving electric energy. Only recently the Oregon Committee on the Relation of Electricity to Agriculture, supported largely by the utilities and composed of representatives of the agricultural colleges, Grange members, the Farmers' Union and the utilities, reported that electricity is extended to the farms of Oregon to an extent seven times as great as it is in the Province of Ontario. In Oregon more than 15 per cent of the farms are receiving electric energy; in California more than 30 per cent, and in Washington fully as many as in Oregon if not more. There has been seven times the advancement here under private control and development that there has in Ontario which is held up as such a shining example.

What the Ontario Farmer Pays

Furthermore, the farmer in Ontario who intends to receive service must agree at the outset that for twenty years he will pay a fixed charge, whether he takes energy or not, ranging from $3.11 to $11.88 per month and that this charge becomes a lien upon his farm collectible as are taxes. He pays for his energy after that, and the initial rate he pays is 8 cents. Only after he has used more than 30 kw-hr. per month does he get the 2-cent rate. There are over a thousand farmers in Ontario today who are paying the fixed charge, because in the enthusiasm of the moment they signed a contract imposing a lien for twenty years upon their farms, and have not had sufficient funds in the meantime to install the wiring necessary to give them electric service. Moreover, in addition to these heavy charges the province itself puts up 50 per cent of the cost of all rural extensions. Yet only 2.52 per cent of the farms are electrified as against 15 per cent in Oregon.

It would seem that this dream of publicly owned water power is simply an appeal to the imagination based upon the fallacy that something will be cheap. There is no such thing as a cheap hydroelectric development. Every development in the West is an expensive one in the matter of capital involved. Each time more power is needed we must go farther afield for power sites, and we are going to find increased difficulties from an engineering and financial standpoint.

A totally different aspect is placed on the situation when the relative progress made in steam-power and water-power machinery is considered. The efficiency of water wheels is now 85 or 90 per cent of the theoretical maximum and hardly can go higher. Can the same thing be said of steam? Efficiency in steam-power production has increased enormously in the last decade, and no one dares predict as to the future. Steam power is now the major source of energy in the production of electric service and always will be. Coal is still the master of production of energy and as the possible production of kilowatt-hours per pound of coal is increased, steam power will become more important and the importance of hydroelectric power relatively reduced.

The Columbia River Development

Reference is made to the possibility of making a great development on the Columbia River. While this stream holds great possibilities for power development there are no sites economically feasible of development under present conditions to meet present market requirements. It is impossible to develop a great power plant on the Columbia River unless there can be secured in advance of the development a sufficient primary load to pay at least a portion of the fixed charges upon such a development. My friend says that all the energy from such a plant would be used by industries which will flock to this country just as soon as they know that energy can be secured at a low cost. Energy cost means comparatively little to the average manufacturer; reliability of service means infinitely more. It is only in the case of those energy-consuming enterprises in which energy represents the major cost of manufacturing that low cost power is the moving consideration in determining the location of the industry.

Bear in mind, with the possible exception of Niagara, energy can be produced and sold and is being produced and sold in these Pacific Coast states as cheaply as it is in any other section of the continent. We have cheap power as it is today, and we are willing to make such additional provisions as the market requirements may demand. Each and every company is doing all that it can to create new markets. It is to the advantage of this industry to create every market it can for the use of power, to keep its developments in advance of any requirements, to be ready at all times to meet the increasing demands of the public with energy at the lowest possible rates. It is my opinion that we are accomplishing this most important task.

Merchandising Electric Bake Ovens

By R. W. Faville

Sales Engineer, Northwestern Electric Company, Portland

A PROFITABLE field for developing the industrial heating load has been found among the bakers by the Northwestern Electric Company, Portland. The author, who has specialized in this activity for the company, here gives some interesting facts about the value of the load, how the business was secured, and operating data on typical installations.

THE housewife with her electric range, toaster and kindred appliances has shown a growing attention to hygiene in the manufacture of those food products she purchases from the baker. In turn, the baker to satisfy the demand for cleanliness not only has been quick to adopt these new processes of mixing that are the most sanitary but also is learning that the electrically heated oven insures cleanliness and produces a uniform product that cannot be surpassed and that these features of his business can be capitalized with good effect.

From the central-station standpoint, the dollar-and-cents value of tying in the activities of the domestic electric-range salesman with the wholesale baker cannot be determined, but the Northwestern Electric Company, Portland, knows it to be of material benefit to both and a great help in exploiting heavy-duty baking equipment. The company believes the electric bake-oven load is good business, and with the intent of interesting others in this class of commercial activity some recent results are recited in this article together with a discussion of some of the factors entering into the securing of such business.

The last six months of 1925 brought a phenomenal growth in bake-oven load to the lines of the company. The addition during this period totaled 530 kw. in capacity through which is realized a yearly revenue in excess of $12,000. This increased load is made up of ten oven installations of from 18 to 220-kw. capacity each, the largest being a full traveling oven capable of producing over 2,000 loaves of bread an hour.

Cost of Fuel Offset by Other Advantages

In Portland we are confronted with difficulties in the cost of operation, and it is assumed that each utility company has this unfavorable condition to overcome. For example, here the cost of gas is 55 cents per 1,000 cu.ft., and wood is selling at $5 or $6 per cord. On a B.t.u. basis, therefore, the cost of electric service is higher than wood or gas, but we have found from experience that gas is but little cheaper. There are few oil-fired ovens here, but in the case of one which is installed alongside of an electric oven the cost of operation is greater than the electric. Our main competition, therefore, is with wood, but, notwithstanding the higher operating cost of electric ovens, their advantages outweigh the disadvantages of higher cost manyfold.

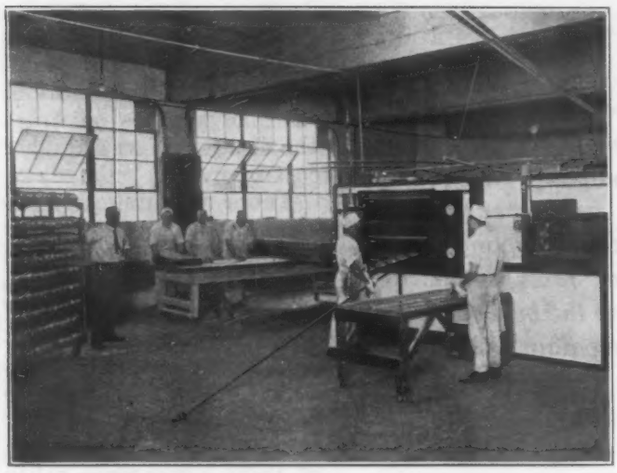
These advantages of the electric oven over other types may be listed as follows: ease of operation, less shrinkage, uniformity of size and color of the product, cleaner operation, portability, flexibility, saving in labor, and elimination of steam injection. Upon each of these advantages taken as a subject a separate article could be written, but space prohibits at this time and the present discussion will be confined to a general consideration of certain types of electric ovens, with operating data given on certain typical installations.

Types of Ovens and the Traveling Oven

Electric ovens may be divided into three types: the reel type, in which the bread trays revolve within the baking chamber; the shelf type or peel oven, which is the best known type, with one or more baking chambers or decks with heating elements above and below each deck; and the traveling type, in which the bread trays are conducted the length of a long baking chamber while the baking process is completed in one trip. The reel-type oven has proved unsatisfactory in this locality, due to the larger air space in the baking chamber and the consequent loss of heat in loading and unloading. The shelf-type oven is very efficient and is adaptable to all kinds of baking requirements so that it is by far the most numerous type in use. The traveling oven can be applied successfully only to the needs of the larger plants, but where it is applicable it effects four major savings: in labor, because it requires fewer men to operate it; in lower first cost, because it can be constructed cheaper than a brick oven of similar capacity; in portability, because it can be moved readily; and in flexibility, because by the easily accomplished addition of sections a larger production requirement can be met.

Because the traveling oven is at present in less common use than other types, a brief description of two recent installations of this type might be of interest. One such oven, for baking cookies only, is 36 ft. long and 3 ft. wide, having a variable rate of travel of the belt through the baking chamber of from four to twenty-four minutes per trip. At

the loading and unloading ends movable baffle bars are placed obliquely so that they may be raised and lowered to suit the size of material placed on the belt. For example, if a cookie one-half inch thick is being baked, the baffle bars are raised one inch to allow clearance. This feature minimizes heat loss and prevents a draft from forming in the baking chamber. The conveyor upon which the cookie pan is placed is of the chain type and can be stopped at any point of its travel if this is necessary.



A 50-kw. two-deck oven which because of its satisfactory performance the baker has used more than he anticipated. Next to it may be seen a section of an oil-fired oven.

At the unloading end of the oven a cross conveyor catches the pans on their expulsion from the baking chamber and carries them some fifty feet across the room at right angles to the oven. Fans placed underneath this conveyor cool the product so that at the end of this run the cool cookies can be gathered and packed. The economy of operation due to labor saved more than pays for the entire electric service rendered, not only for the oven but also for all other power installed. This oven is installed in the plant of the largest cookie manufacturer in Portland.

The other traveling oven is 56 ft. long and 8 ft. wide, connects 220 kw., and is thought to be the largest such oven in use on the Pacific Coast.* Its conveyor, which likewise can be stopped at any point in its travel, can be operated at a variable speed of from eight minutes to forty-eight minutes per trip. This variable speed is intended to meet the baking requirements of all classes of product from macaroons to bread. Again the principal saving is in labor since it requires only one man to load and unload. The oven is operated on and off throughout the 24-hour day, and the average daily consumption is 1,300 kw-hr. A demand chart shows the daily peak demand to fall between the hours of 8 p.m. and 1 a.m., a characteristic of distinct benefit to the system load curve. The day operation shows smaller peaks at 10 a.m. and 3 p.m. when pastry and sweets are being baked.

* A picture of this installation was published in the Journal of Electricity March 15, 1926, p. 236.

The greater number of installations are made of smaller ovens, namely, 18 kw. or less. Our rate allows us to realize a higher return per kw-hr. on an installation of this size, but at the same time this puts us in more difficult competition with other fuels. The fuel-cost difficulty is overcome largely by selling the baker on the cleanliness and sales value of the electric method when the oven is placed in view of the customers. Our success in using this sales argument along with others has been such as to place in service, during the period referred to above, more electric ovens than all other kinds combined.

Operating Data

In order to give an idea of the operation of ovens of different classes of customers there follows a tabulation for each of four customers classified as to their size and the kind of business done, in which are included connected loads, kw-hr. consumptions, costs and outputs, with remarks on the manner of securing the business.

Installation No. 1 may be classified as a large wholesale bakery doing a general business including break, cakes, pies and pastry.

Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven and lights	390.61	817,500	68,125	1.075
Power	37.02	80,484	6,707	2.127

This installation includes two deck-ovens with a connected load of 80 kw. each, and one full traveling oven of 220-kw. load. The capacity of the plant is 4,000 loaves per hour. A substantial saving in labor cost has been effected in the plant through the installation of the electric equipment. In securing the business the power company financed the purchase of the ovens for the customer, and the manufacturer guaranteed performance.

Loading end of traveling electric oven installed in the plant of the Grandma Cookie Company, Portland. It is used for baking cookies only.

Installation No. 2 may be classified as a specialized bakery manufacturing cookies only.

Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven	50	108,000	9,000	1.368
Power and light	20.51	8,733	962	4.281

In this installation a continuous traveling oven replaced a rotary gas oven of the reel type. The labor saved by electric operation pays for the entire power bill. The cost per dozen cookies of all classes averages one-fifth of a cent. To secure the business the power company financed the purchase of the oven while the manufacturer guaranteed performance. Help was given also in designing the oven to meet the customer's needs.

Installation No. 3 is a small bakery baking bread only.

Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven and lights	51.17	141,576	11,798	1.318
Power	5.34	9,108	759	3.615

A 50-kw., two-deck oven is used, and the customer has an oil-burning oven standing alongside of the electric oven. Because of satisfactory performance the customer has used the electric oven more than he anticipated. In this instance likewise the power company financed the purchase of the oven, and the manufacturer guaranteed performance.

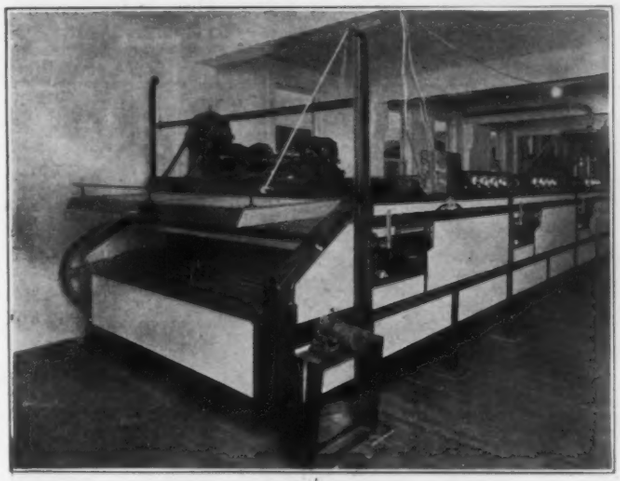
Installation No. 4 is a small retail bakery doing a general baking business including bread, cakes, pies and pastry in a suburban district. It utilizes a 12-kw., two-deck oven, which is about the average size oven for a bakery of this class. It was not necessary to finance the purchase of this oven by the baker, but co-operation with the manufacturer was essential to securing the business.

Operating Data

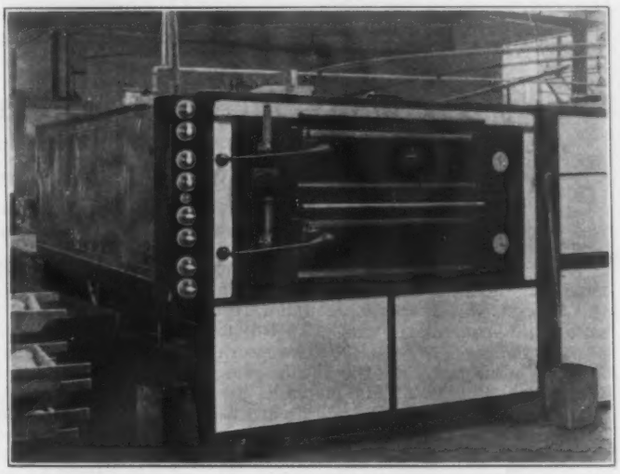
	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven, lights and power	12.46	23,832	1,986	2.515

Conclusion

In general it may be said that the electric-oven load on the lines of the Northwestern Electric Company is a desirable load to carry and has produced satisfactory revenues. This business did not come in over the counter. It was sought actively and was secured by sound economic sales arguments, by co-operation with the manufacturer in the sale of ovens, and by a liberal merchandising policy which recognized the soundness and practicality of assisting the baker to finance the purchase of his equipment. Such financing was found necessary mainly in the case of the larger ovens such as are used by the wholesaler. It is believed that conditions in the baking and electrical industries in Portland are not unusual, and that a similar sales activity in other cities can be carried on with like success.



Unloading end of large traveling electric oven. Variable-speed device to regulate rate of speed of conveyor may be seen on top of oven.



This 50-kw. two-deck oven is installed in a small bakery in which only bread is baked.

We are, as the oven manufacturers would say, "sold on heavy-duty oven equipment" first, as a builder of load that is in sympathy with our system load curve; second, as a revenue producer; and third, as a sound and practical class of merchandise which is a factor in promoting electricity and its uses in industrial growth.

First 60,000-kw. Turbo-Generator Installed in East River Station of New York Edison Company. —With the aid of two 200-ton cranes, a 60,000-kw. turbo-generator, the most powerful machine on earth, in parts weighing as much as 175 tons each, recently was installed in the new East River Station of The New York Edison Company. Capable of generating 80,000 hp. of electrical energy, enough to light 300,000 six-room homes, operate 31 Panama Canals or pull 47 Twentieth Century trains, the turbo-generator was placed in its final position in what is to be the biggest central station in the world as easily as if it weighed two pounds rather than close to two million pounds. Although this one machine would have supplied all of the electrical needs of New York twenty years ago, it is only the first of nine great generating units to be installed in the East River Station. Its construction was started over a year and a half ago in the Schenectady works of the General Electric Company under the direction of men who in 1890 worked on a 45 hp. generator, then one of the largest in the world. It will take several months to complete the installation of the machine.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

System Flexibility Increased by Phase Modifier

Automatic 10,000-kva. Synchronous Machine Operates Either Leading or Lagging to Maintain Bus Voltage

By E. F. PEARSON and TOM PERRY, respectively engineer and superintendent of Plant Department, Northwestern Electric Company, Portland.

What is believed to be at the present time the largest synchronous unit in the United States operating under full automatic control is the 10,000-kva. phase modifier of the Northwestern Electric Company at the Vancouver, Wash., substation. This machine, together with all auxiliary apparatus and automatic control equipment, is the product of the Westinghouse Electric & Manufacturing Company. It

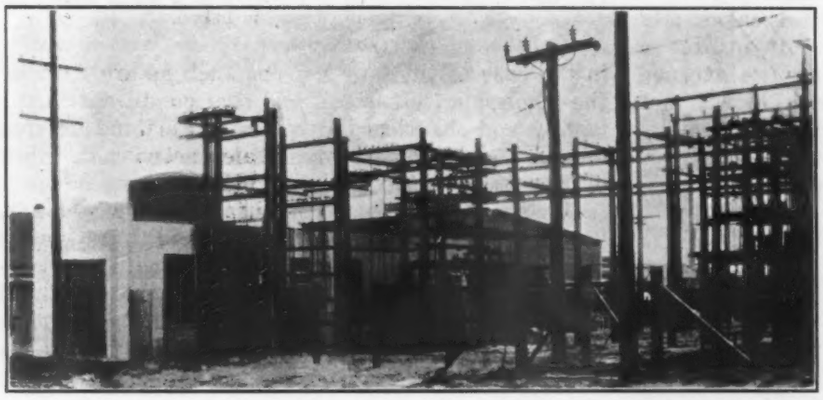


Fig. 1. Vancouver, Wash., substation of the Northwestern Electric Company.

was installed in June, 1925, after a considerable study of all conditions affecting the operation of the company's system. During its 10 months' operation it has fulfilled every expectation and has handled properly all demands made upon it.

The installation of a phase modifier was deemed necessary to relieve generators and tie lines of reactive component load and to regulate voltage. To understand the reasons for locating it at Vancouver it is necessary to know that this load center lies at the receiving end of a 65-mile, 66-kv. transmission line. This line comes from the Condit hydroelectric plant on the White Salmon River, one of the company's principal sources of supply. The Vancouver substation with a capacity of 14,000 kva. serves at 11 kv. a combined town and rural load of which the bulk is in large industrial motors. Likewise it is connected by an 11-kv. line with the company's Albina substation in Portland, about five miles distant. It has been customary in case of failure of the 66-kv. line into Vancouver to serve the Vancouver load from the Albina station. With the increase in load at Vancouver this practice had become increasingly difficult due to the excessive reactance voltage drop on this line. It was found that with the phase modifier located at Vancouver not only the then existing load could be carried from Albina but also a 20-per-cent increase in load could be handled over this line. This fact, coupled with the fact that regulation in the Portland district was taken care of adequately by means of synchronous motors on motor-generator sets in one of the Portland steam plants, led to the choice of Vancouver for the location of the phase-modifier station.

Equipment

The equipment consists of one 10,000-kva., 11-kv., 3-phase, 60-cycle, 720-r.p.m. phase modifier designed to operate at 10,000 kva. leading and 7,000 kva. lagging; one 80-kw. direct-connected exciter; main and auxiliary field rheostats; one starting-duty auto transformer; one main station oil circuit breaker; one starting and one running circuit breaker; one oil-pressure pump for bearing oil; one 125-volt storage battery; and one motor-generator charging set for the battery. Automatic control is effected through a switchboard of five panels two of which, the field panel and pump control panel, are mounted separate from the main board.

All this equipment is housed in a concrete building placed adjacent to the substation grounds. The phase modifier unit is connected through the station breaker to the 11-kv. outdoor substation bus. Through the fan action of its rotor, cooling air is drawn through a sheet-metal duct in the side of the building and discharged through an outlet louvre in the roof. Concrete partitions separate the main room, where the unit and switchboard are located, the circuit breaker room, the auto transformer room, and the battery room. Circuit breakers and connecting cables are enclosed in concrete cells with sheet-metal explosion doors and panels.

Operation

As previously mentioned, the phase modifier is built to run leading or lagging and is controlled so that the loads carried by it vary to maintain a constant pressure of 11 kv. on the bus. Generally on week days when the load is normally heavy the unit runs leading while during light-load periods on Sundays and holidays it runs lagging. Thus it operates both as a synchronous condenser and a synchronous reactor. A load-limiting device prevents the unit from overloading.

The automatic control is designed to

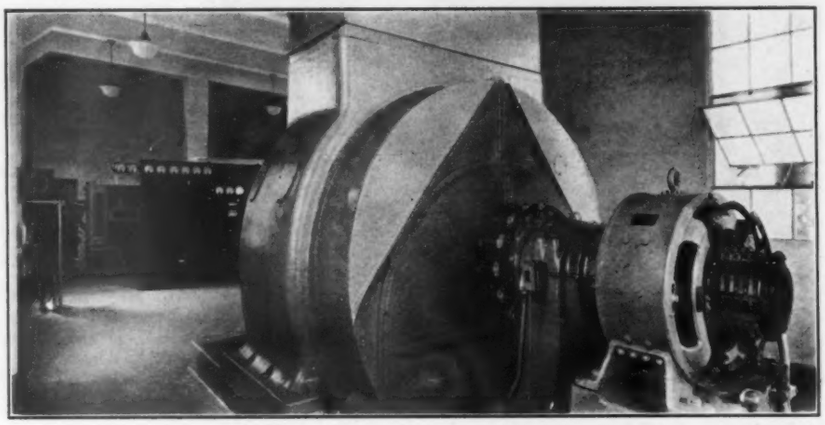
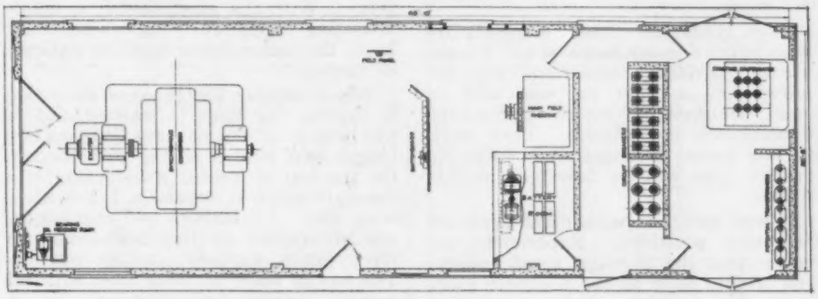


Fig. 2. Interior of Vancouver, Wash., substation of the Northwestern Electric Company showing synchronous machine and part of full-automatic control equipment.

take care of a variety of conditions and emergencies. It will shut the unit down when the trouble occurs and after the trouble is cleared start it up again. The following conditions are cared for automatically: extreme low voltage or failure of voltage; extreme high voltage; overheating of machine stator and field as determined by thermal relays; phase reversal; and underloads for pre-determined length of time. The control will shut down the unit and lock out the station breaker under the following conditions: failure of unit to transfer from starting to running position; extreme overload as determined by induction-type relay; overheating of machine bearings; overheating of machine stator as determined by imbedded temperature coils; failure within the machine affecting differential protecting relay; phase failure; and continued excess current in starting compensator. After the station breaker has been locked out it is necessary to reset the lock-out relay before the machine again will operate.



Floor plan, Vancouver, Wash., substation, Northwestern Electric Company

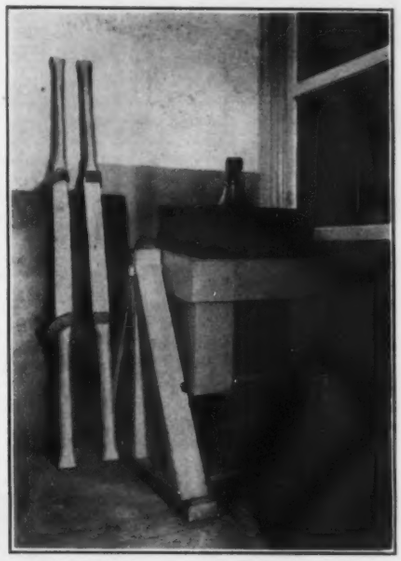
The full-automatic control was decided upon to secure economy of operation by avoiding the necessity of maintaining three shifts of operators. During the first week of operation it was found necessary to adjust all protective relays so that settings would harmonize with system characteristics. Since that time no operators have been on duty, the only attendance on the station being the semi-weekly visits of the inspector.

A brief resume of the operation of the station under the stress of emergencies might be of interest. On several occasions during the early morning hours and on holidays when the system load was light and voltage conditions were such that the phase modifier was not needed it shut down and stayed off until an appreciable variation in voltage brought it back on the line. On a few occasions the unit has shut down due to failure of the line feeding the Vancouver substation and has started up again and brought the voltage back to normal as soon as the bus was re-energized. On several occasions, when it was necessary to take the 66-kv. line out of service, the unit held the voltage to normal with the total Vancouver load carried on the 11-kv. line from the Albina substation. On one occasion subsequent to the failure of a hydro generator the unit was under automatic control of the load-limiting device for several days. This meant that part of the time the unit was carrying load up to the full limit as determined by the load-limit setting, which permitted a voltage slightly below normal but within practical limits. During this emergency and without the phase modifier it would have been necessary to drop considerable load to maintain the necessary minimum voltage. Again, on one occasion due to a heavy short circuit on the transmission line the unit shut down and locked out as it was supposed to do under extreme short-circuit conditions.

Operation of the station to date has been entirely satisfactory, and it is believed that the continuity of service factor will be higher with full-automatic control than with manual control.

Heavy Carboys Easily Handled with Simple Cradle

A convenient means of handling the distilled water carboys used in servicing station storage batteries is shown in the illustration. Usually the carboy reposes upon the floor and it is only with difficulty that the water may be poured into a hand container. As shown here, however, the operators at the Newark substation of the Pacific Gas and Electric Company have rigged up a cradle out of scrap lumber.



Carboy cradle and carboy carrying-handles which greatly facilitate the handling of these large containers whether they be filled with distilled water or acid.

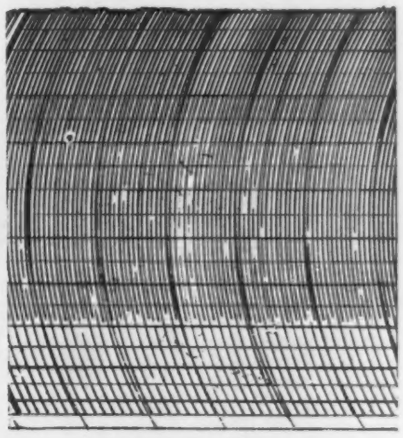
In this particular instance the extra carboys are stored at quite a distance from the little room which houses the station battery. The job of carrying over a full container was a difficult and awkward task until the carrying handles seen leaning against the wall to the left of the cradle were hit upon. These carrying handles are shaped roughly from pieces of 2 x 3-in. lumber. The straps are arranged so that the handles may be slipped down under the cleat which surrounds the box and then given a quarter-turn winding up the straps and clamping the handles tightly against the box. In the illustration the cleat is hidden behind the upper rim of the cradle.

Switch Operations Recorded by Graphic Meter

By M. J. Brooks, Consulting Electrical Engineer, San Francisco.

In a recent test held on some switches manufactured by the Pacific Electric Manufacturing Company of San Francisco the purchaser required the switches to be operated every thirty seconds continuously for 24 hours.

Although observers were stationed at the switches, on account of the fact that one failure to operate at any time during the test would mean an entirely new run, it was thought best to have a permanent record of the operations. An Esterline graphic wattmeter accordingly was connected in the line supplying power to the switch motors and a very satisfactory record of the operations thus obtained. The accompanying section of the chart shows each operation of the switches over a period of about 40 min. It will be noted that the opening of the switches may be distinguished from the closing, on account of less power being required to open.



Section of graphic wattmeter chart showing record of 30-sec. switch operations.

At a lecture the speaker orated fervently:—He drove straight to his goal. He looked neither to the right nor to the left, but pressed forward moved by a definite purpose. Neither friend nor foe could delay him nor turn him from his course. With a masterly singleness of purpose and with eyes for only the far-away goal he forged on utterly oblivious to intervening obstacles. He, the mighty truck driver.

Annunciator System Indicates Switch Operations

Service Restoration Greatly Expedited by System which Conveys Instant Information to Operator

By A. E. DAVIDSON, Engineering Department, Southern California Edison Company, Los Angeles

A dependable annunciator for various types of trouble is becoming more recognized as a necessity in the modern substation and power house. It generally is conceded that these signals should be both visual and audible. The visual signals show the individual indicators while the audible may be common for all annunciations. The desirability of centralizing all of these indications at one point led to the design of the apparatus herein described. Because of its reliability and ruggedness, telephone equipment is used for this work.

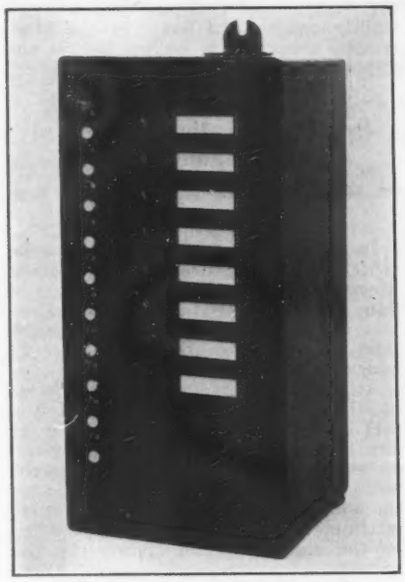


Fig. 1. Face view of telephone-type annunciator for small substations.

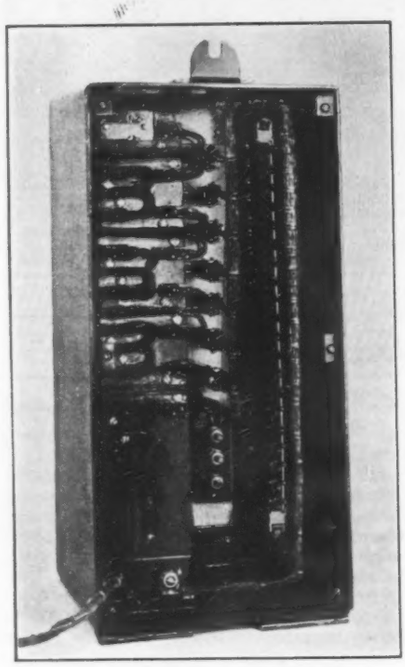


Fig. 2. Rear view of telephone-type annunciator for small substations.

Two types of these annunciators were built; one for large power houses where individual indications are required and another for use only in small substations where group-type annunciation is sufficient. Both work on the same principal, but only the smaller type will be described in this article.

It was designed with eight separate indicating positions. Experience has shown that the average small substation of this class on the Southern California Edison Company's system requires indications of the following conditions:

60-kv. oil circuit breakers, miscellaneous, water tank alarm, bearing alarm, 15-kv. oil circuit breakers, transformer temperature, no voltage alarm and station ground detector.

For each of these alarms a common gong, located at any convenient place, is sounded and individual lamps for each circuit are brought into operation.

Figure 1 shows a telephone-type box annunciator suitable for either desk or switchboard mounting. On the right side are mounted card holders with celluloid windows and name plates for each position. In the center is a row of standard switchboard keys. On the left side is a standard lamp jack containing 20 lamp positions, only 15 of which are used. Inside the box and directly behind the card holders a thin metal mounting plate holds eight S-148 telephone-type relays and one type HG relay. With the exception of a maple mounting strip for the switchboard keys, the annunciator is made entirely of metal.

When regular switchboard mounting is desired the back is omitted and to the bottom of the box are fastened two hinges that hold it to the switchboard. On the top is welded a mounting clip through which is passed a bolt with a wing nut. All fittings and clip angles are arc-welded to the boxleaving no rivet heads exposed on the outside. The box is made of office steel with all corners welded and rounded. It is finished with a dull, black, baked enamel similar to the familiar desk-stand telephone. When the apparatus is located on a desk a back is provided and a rubber pad is fastened to the bottom. The front plate also is made of office steel and is removable allowing ample room for adjusting the relays.

This annunciator is wired according to telephone practice, all of the internal wires being brought together in a hand-made form. Figure 2, which is a rear view of the box with the back

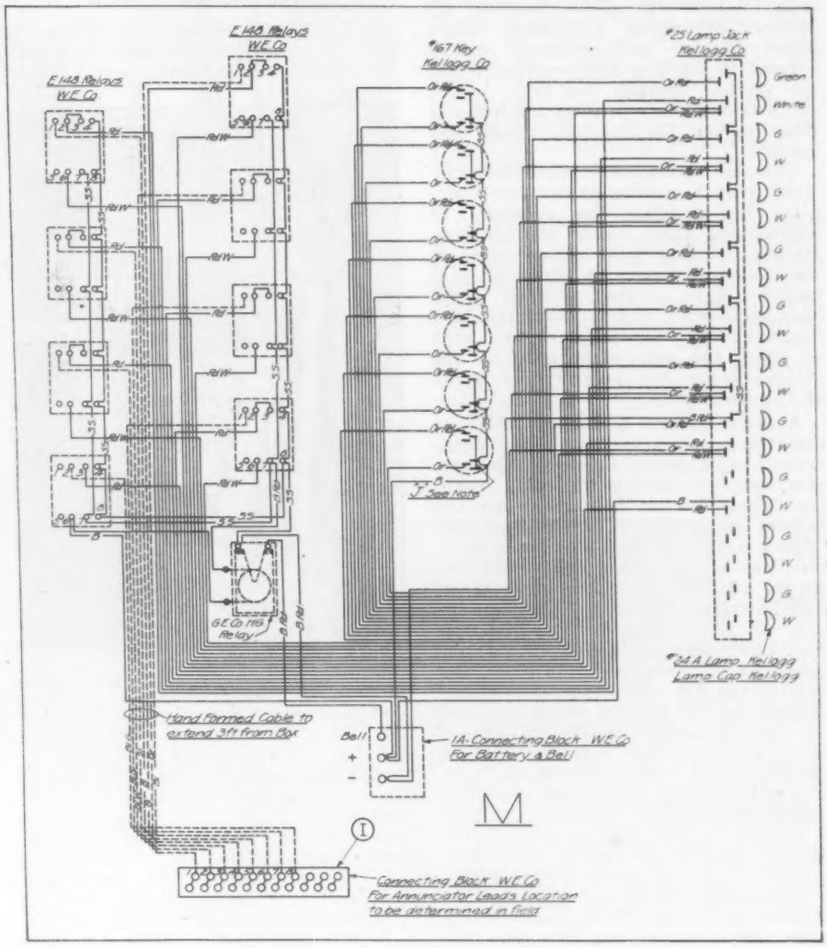

E 148 Relays W.E.Co
#167 Key Kellogg Co
#25 Lamp Jack Kellogg Co
Green
White
See Note
GE Co 116 Relay
#24 A Lamp Kellogg
Lamp Cap Kellogg
Hand Formed Cable to extend 3 ft from Box
Bell
1A Connecting Block W.E.Co For Battery & Bell
M
Connecting Block W.E.Co For Annunciator Leads Location to be determined in Field

Fig. 3. Wiring diagram for annunciator shown in Figs. 1 and 2.

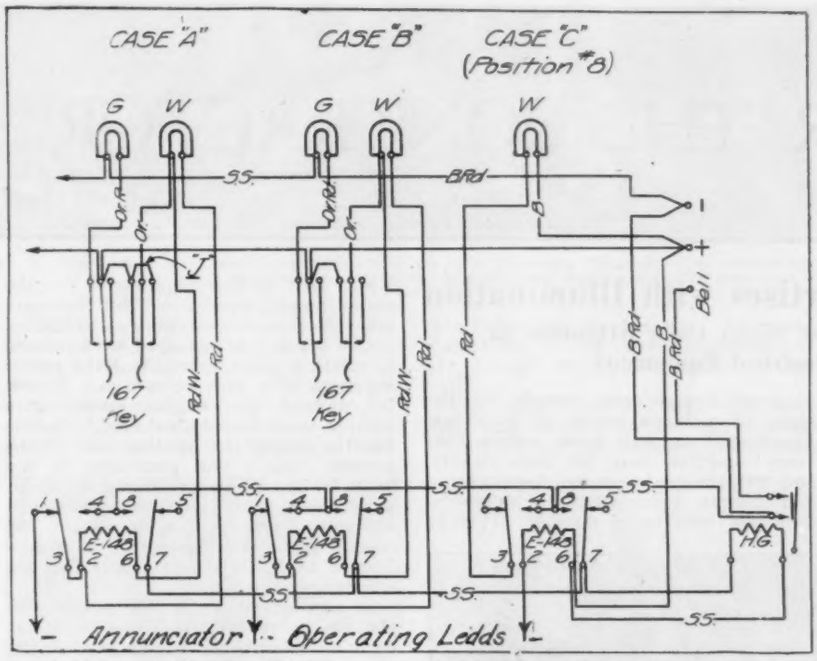


Fig. 4. Schematic diagram explaining operation of annunciator. (See text.) Case "A" is for momentary-contact operation. Case "B" is for continuous-contact operation. Case "C" is for ground detector. Circuits 1 to 7 wired as per case "A." When case "B" is desired, cut jumper "J."

removed, shows how this is done. On the right the form is directly in back of the lamp jack, the wires looping down to each lamp position. This form extends across the top and down behind the relays. The bottom end of this form is brought out of the box in a 3-ft. pigtail on the end of which is a terminal block. This pigtail is made up of the standard telephone-cable color code, i.e., blue, orange, green, brown, slate, etc.

The wiring diagram, Fig. 3, shows how simple it is to apply telephone practice and color code to this class of apparatus. Figure 4 is a schematic diagram illustrating the operation of the annunciator. Case "A" shows the circuit where a pallet switch used on oil circuit breakers has a momentary contact. The annunciator operating lead is connected to the E-148 relay. This telephone-type relay locks itself in, lights a white lamp, and operates the HG relay which rings the bell.

Since the contacts of the telephone-type relay are of limited carrying capacity the HG relay was added in order to make it possible to ring more than one bell. The operator then presses the key opposite the white lamp burning. This restores the E-148 relay, releases the HG relay and bell and also lights a green lamp from a local circuit. The annunciator then is in a position to receive a second signal on the same circuit. This time the telephone-type relay operates the white lamp and bell the same as before, while the green lamp continues to burn until such time as the board is cleared.

The operation in case "B" is exactly the same as of case "A" except that the pallet switch has a continuous contact such as a bearing or transformer temperature alarm. When the key is pressed the green lamp is lighted, the bell and white lamp are cut off; but because of the continuous contact on the pallet switch no second signal may be received. Figure 3 of the diagram shows all key positions wired for momentary contact operation. When a continuous contact set-up is desired the change may be made quickly in the field by cutting the jumper "J." This removes the self-locking circuit of the telephone-type relay.

Case "C" or bottom position always is reserved for the ground detector because there is no key used in this circuit as shown in both diagrams and in Fig. 1. Only the bell and a white lamp are operated when the station ground detector closes a continuous-contact pallet switch. Both the bell and white lamp remain on until the operator opens a switch on the ground detector panel. Another instrument on this panel will continue to indicate the existence of ground until the same is cleared.

Figure 5 shows a cabinet-type annunciator used in larger stations and power houses where individual indications are required. This instrument is equipped with the same type lamp jacks, keys and telephone relays, the HG relay being mounted elsewhere on the switchboard. Operation is the same as described for the smaller type. This cabinet is siutable only for desk mounting because of its size. It is made of oak and finished to match the operator's desk.

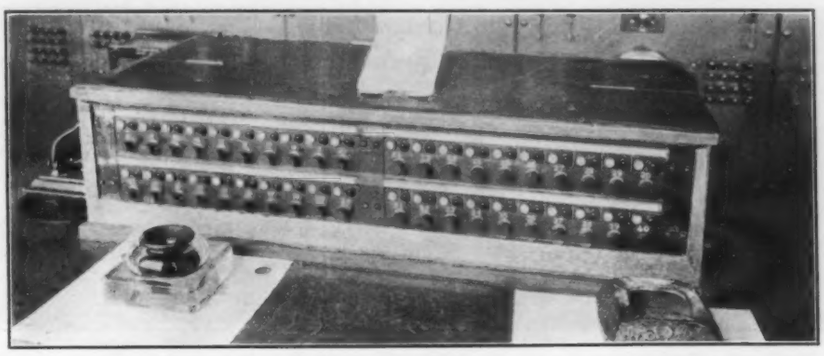
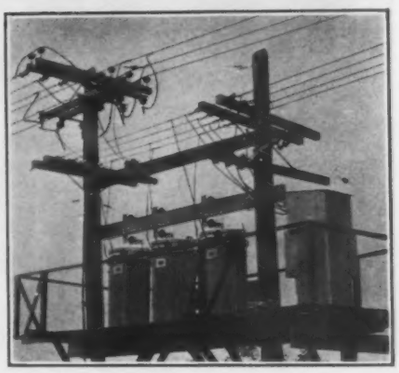


Fig. 5. Desk-type annunciator for larger stations; installed at Colton substation of the Southern California Edison Company

Pole-Top Distribution Station Serves Growing Area

The accompanying illustration indicates the substation construction employed at the National City and Chula Vista substations recently remodeled for 4-kv. operation. Primary supply is obtainable from either of two 11-kv.



National City 4-kv. pole-top substation of the San Diego Consolidated Gas & Electric Company; three transformers and one regulator. Energy may be taken from either of the two 11-kv. lines.

feeders, through Klauber repeating fuses. Due to the length of the 4-kv. feeders and to the residential character of the load, both of these stations are equipped with 3-phase, 4-kv. induction regulators mounted on stubs at one end of the substations.

Line maintenance under difficulties. A crew working on a line on the Continental Divide at El. 12,050. Drift depth is indicated by the 35-ft. pole.

IDEAS FOR THE CONTRACTOR

Electrified Laundry Advertises with Illumination

Brilliantly Lighted Building at Night Calls Attention to Peerless Laundry's Electrical Equipment

Located at the intersection of two much-traveled highways over which thousands of motorists pass every night, a laundry in Los Angeles, Calif., has utilized its location, enhanced by brilliant illumination, to sell itself to the public as a most up-to-date and modern institution. Nor is the mere advertising of this idea sufficient; the laundry itself bears out the thought in actual installation and mechanical and electrical refinements.

Passersby at night by thousands at the corner of South Main Street and Slauson Avenue are struck by the sight of a large group of buildings, illuminated so well from within that every machine may be seen clearly, and externally by some floodlighting and unique color effects. Moreover, they are told by a number of large electric signs that the Peerless Laundry is located there. And from what may be seen through the windows it is further evident that the institution is electrified in every particular.

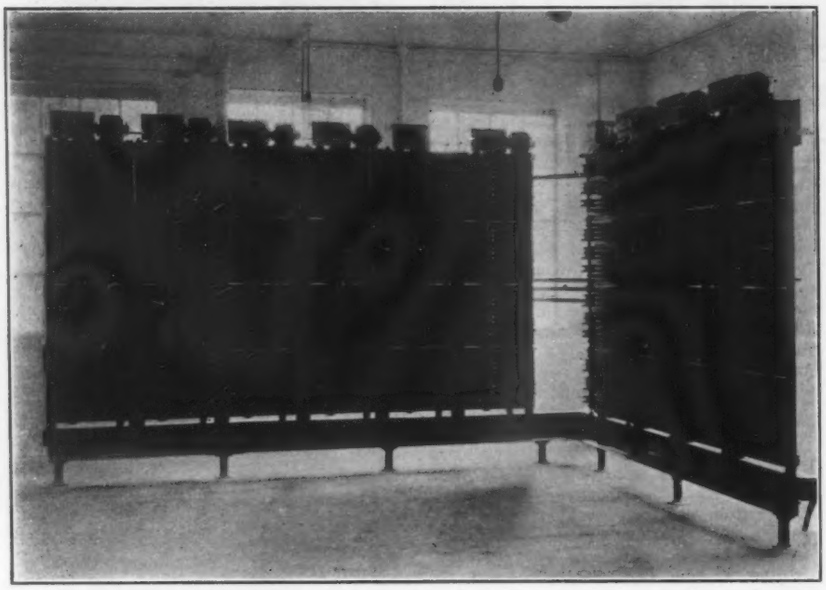


Fig. 1. One of two boards controlling flat-work washers. This board controls 40 machines. Contactors automatically reverse each of the motors on the washers.

There are some 600 motors in use throughout the plant, most of them 3-hp., used as individual drive for the many laundry machines. But there are other motors, too, ranging up to 125-hp.

The laundry is equipped with its own generating plant, a result of the power shortage of a year or so ago. A 160-hp. natural gas engine operating a 150-hp. generator is installed. This is used to supply the lighting load at the present time. The generator is one made by the Electrical Machinery Company, and is a 150-kva., 900-r.p.m., 240-volt, 3-phase, 60-cycle unit. The output from this generator is transformed to 220/110-volt power for use throughout the plant.

In case of failure of the power supply, the board for power and light has on it a double-throw switch so that the power supply may be switched over to the city service. The city of Los Angeles Bureau of Power and Light supplies all of the power for operating the general motor load, the plant's own generator supplying only a small portion of motor load.

The control board shown in Fig. 1 is one of two similar boards controlling all flat-work washers. The contactors on this board automatically reverse each of the motors on the washers. Each of these two boards controls 40 machines. The boards are American panel boards, manufactured by the American Laundry Machinery Company.

The washers themselves are monel metal cascade washers. Each is equipped with individual drive, for which a start-and-stop button is provided at the washer.

To take the surplus water from the clothes after washing, Humatic extractors made by the same laundry machinery company are used. The clothes are placed in the extractor, which is started by pressing a button. Centrifugal action is utilized to extract the water, the extractor running the specified length of time and automatically stopping and opening up. Green and red signal lights above each unit indicate whether or not the machine is operating.

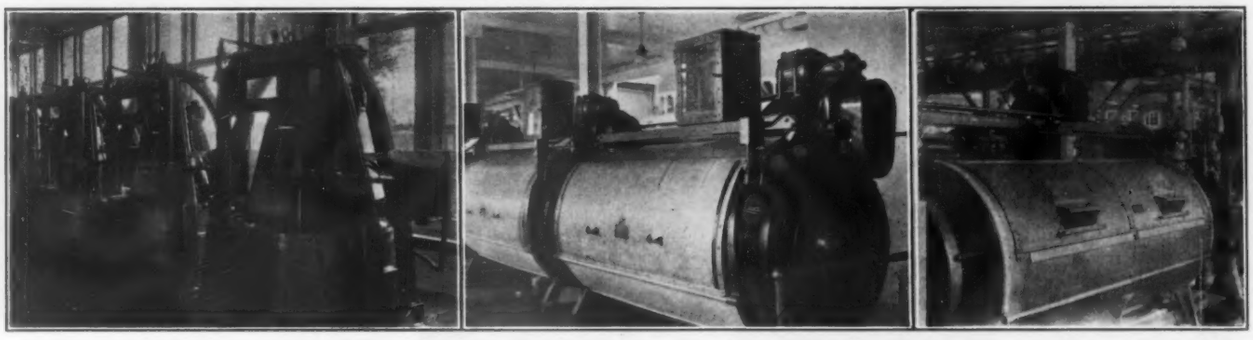


Fig. 2. A group of the extractors, showing the signal lights above each unit which denote whether or not it is in operation. Fig. 3. Two of the dry tumblers. The automatic reversing equipment for the motor operating them may be seen on the left of the motor. Fig. 4. Two of the washing machines, made of monel metal. The motors are operated from the control panel. The type of illuminating unit used in the building may be noted in this picture.

Fig. 6. The laundry as it appears at night from the main highways. There are four exterior electric signs used on the building. Fig. 7. Lighting on the exterior of the receiving and shipping departments. The large roof sign may be seen on the right.

Shaker tumblers are used to separate the clothes after they have been through the extractors. They are used on all flat work. Dry tumblers are used for all rough-dry clothes.

One of the features of the advertising illumination is the lighting of the

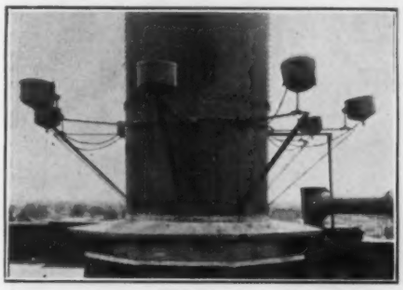


Fig. 5. The base of the stack and the floodlights used on it. One unit is directed on the steam emitted from the pipe on the right.

huge stack. The stack, more than a hundred feet high, is painted red. It is floodlighted by means of eight 500-watt X-Ray units and three 1,000-watt units manufactured by the Pyle National Company of Chicago. To add to the effect steam is ejected around the base of the stack and this is lighted by two red, one green and one amber lamp. When first installed these were all red floods, but the effect was so realistically like a fire that many people thought the building on fire and turned in alarms. A number of urns emitting steam are located at various places around the plant and illuminated also.

The entire plant is lighted every night until 11 p.m. The cost of this operation is charged to the advertising department as it is considered the finest kind of advertising. The plant is kept always spotlessly clean, a fact which is to be seen from the windows.

Ventilating Fan in Vault Used in Glendale Light System

A self-cooled motor fan operating in the transformer vaults of the electrolier system recently installed in the city of Glendale, Calif., has reduced temperature in these vaults 58 deg. This feature is but one of many in the installation made in Glendale on Colorado Boulevard between San Fernando Boulevard and Eagle Rock city limits by the Robertson Electric Company of Santa Ana.

Another feature of the installation is that it was wired with two circuits so that 83 units on the property side may be turned off at 10 p.m. and that all units on the property side may be turned off at midnight, one unit on each of the 83 standards on the street side remaining on all night. Alternate standards on the street intersections are burned with both units on all night.

The installation includes 157 two-light standards of a special Glendale design. They are cast-iron standards,

Electroliers of the recently installed system on Colorado Boulevard, Glendale, Calif. The street-side lamps burn all night, the property-side lamps until midnight.

reinforced by means of a 2½-in. welded steel pipe of extra strength embedded in the foundation. This is intended to prevent segments of the cast-iron standard from flying in case the posts

Inside a transformer vault on the Glendale lighting system. The transformers and oil cutouts are shown plainly.

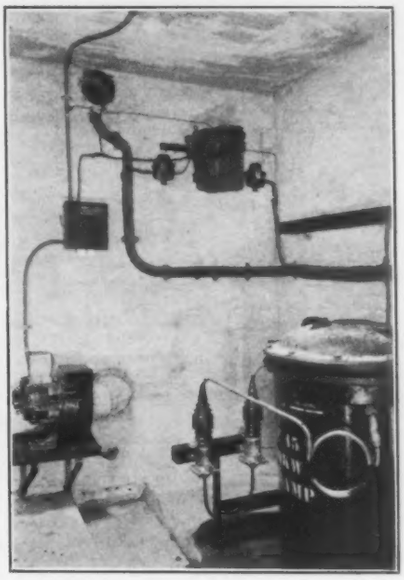
are run into and demolished by automobiles. The average distance between standards is 146½ ft.

The lighting units are Westinghouse Electric & Manufacturing Company globes of rectilinear glass with opalescent cast, using a Paragon senior top. Each unit is equipped with a Westinghouse 50-cycle auto transformer for 6.6 amp. with taps for 400 cp., 15-amp. and 600 cp., 20-amp. lamps. Lamps installed in the original installation are 400 cp.

Both the part-night and all-night cables are brought to a disconnecting pothead in the base of each standard. Conductor is No. 8 solid copper with 30 per cent Para rubber braided cover. The cable is No. 8 solid copper with 9/64-in. varnished cambric insulation and a lead sheath of 5/64 in. It is run in 1½ and 2-in. Sherarduct.

Power is brought into the primary side of the transformers, located in the transformer vaults, at 4,000 volts to ground. The transformers are General Electric Company subway transformers. Three vaults are used at intervals of approximately two blocks apart. D. & W. standard pole-type oil fuse cutouts, fused for 1 amp. per kw. of transformer capacity, are installed in phase tap to the transformer. A General Electric porcelain cutout, based with solid copper, is installed in connections to neutral.

The transformer vaults are ventilated by means of an ⅛ hp. a.c. Ilg self-cooled motor, operating a ventilating fan. A smaller transformer is used to supply power to the fan. Since installing the fan the temperature inside the vaults never has exceeded 100 deg., whereas before installation the temperature reached 158 deg. F.



The other end of a transformer vault on the Glendale lighting system, in which may be seen the ingenious ventilating fan arrangement and the small transformer used in stepping down current for the fan motor and lighting the vault.

Questions and Answers on the Code and Safety Orders

Arrangements have been made with Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, to answer through the columns of the Journal of Electricity such questions on the National Electrical Code as are of general interest.

Similar arrangements have been made with George E. Kimball, electrical engineer of the Industrial Accident Commission of the State of California, to answer questions on the Electrical Safety Orders issued by the Commission.

While it is the object of this department to assist in a better understanding of the Code and the Safety Orders, replies given are not to be considered as official interpretations applying in all instances, as some of the rules permit of varying interpretations under different conditions. The questioner should be guided by the inspection department having jurisdiction.

All who are interested are invited to send in their inquiries regarding the National Electrical Code to Claude W. Mitchell, Board of Fire Underwriters of the Pacific, Merchants Exchange Building, San Francisco, Calif., or to the Editor, Journal of Electricity, 883 Mission Street, San Francisco. Questions on the Safety Orders should be sent to George E. Kimball, Industrial Accident Commission, State Building, Civic Center, San Francisco, or to the Editor.

Q. 13. To comply with Order 711-2(d), would it be necessary to fuse separately the control wires running to the push button if the control wires were protected only by the starting protection exceeding the Table A in 702-1(q)?

As an example, if a 3-hp., 220-volt, 3-phase motor were installed and operated by a remote-control switch having 25-amp. fuses used for starting protection and three No. 14 wires were used to the push button, would it be necessary to install an additional cut-out with 15-amp. fuses to cover the requirements of this order?

A. There are a number of factors which enter into this problem and it must be considered from several angles. Considering the most common classes of installations, as for example, polyphase motors operating at 220 or 440 volts, using automatic or automanual starting devices with remote-control switches, we would consider a control circuit as being protected if the branch circuit fuses for the motor were not larger than 45 amp. It is understood the wire in the control circuit will not be smaller than No. 14 whether fused or not. This, under ordinary circumstances, would permit control circuits to be installed without fuse protection, on motors not larger than 5 hp. operating at 220 volts or 10 hp. at 440 volts, other than that provided by the motor circuit overload protection. The problem would be more simple if it were only a question of protecting the conductors of the control circuit, but frequently the control buttons at "start" and "stop" stations develop trouble, and fuse protection may be necessary in all cases even though the control circuit switches may be located close to the motor control device. This department, however, will approve installations without fuses in the control circuit on polyphase motors operating at less than 600 volts regardless of the size of the motor, if the control buttons are installed as a part of the starting device or are located not more than 3 ft. from it. If later experience proves that this method is hazardous, fuses will be required in the control circuits regardless of the location of the switches. Cartridge-type cutouts may be installed in a metal cabinet close to the starting device. The cover of the enclosure must be marked with the regulation warning, "Open switch before fusing." An individual switch is not required directly ahead of the fuses when they are installed at the motor-starting device, but the motor circuit switch must be marked plainly, identifying it with the circuit so that it may be located readily and opened to disconnect the starting device and control circuit fuses.

Power Company Manager Takes Red Seal to His Home.—P. D. Shepperd, manager, Fort Lupton Power & Light Company, Fort Lupton, Colo., doesn't believe the story about the shoemaker's children, and accordingly has so added to the electrical installation in his own home that it recently was approved according to the Red Seal specifications. Mr. Shepperd has done much to further the popularity of Red Seal homes in his community which is included in the territory served by the Electrical League of Colorado, Denver.

Illuminated Greasing Rack at Fresno Service Station

For the convenience of the autoist who would have his car greased after sundown, a former employee of the San Joaquin Light & Power Corporation and his partner in establishing a service station in Fresno hit upon the novel plan to have the greasing pit will illuminated so that this work might be done as well at night as by day.

The Hazelwood Service Station, as it is known, located at 2941 Ventura Avenue, Fresno, employs a pit for greasing operations rather than an elevated platform or rack. The pit is 16 ft. long, 8 ft. wide and 6 ft. deep, and lined with concrete. A concrete curbing surrounds the pit opening, in which recesses have been provided for the installation of the lights. The car is run over the pit on two 18-in. I-beams 20 ft. long. These provide runways wide enough to accommodate dual-tired trucks.

If the greasing is to be done at night, a turn of the switch throws light under the car chassis from nine 100-watt lamps placed around the pit. Four of the lamps are placed above the curbing, at the corners of the pit, shielded by a wire guard. Four of the lamps are in recesses in the concrete curbing. Another light is directed on the car from above through the usual goose-neck arrangement. All wiring for the lights is run in conduit embedded in the concrete and controlled from the service station.

The service station illumination is the idea of "Blackie" Reithenburg, former San Joaquin employee, and his partner, Shan Kilburn. Another refinement of service offered by these two is that once the name and address of a customer is secured, he is sent a postcard reminding him when his car should be re-greased.

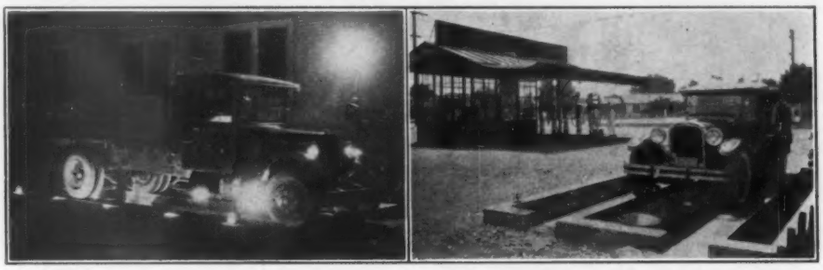
All-Electric Cafe Located on Highway Well Equipped

It would be expected that an all-electric cafe might thrive and flourish in a crowded metropolis, and indeed many an opportunity to sell complete electrical equipment for such an installation has been let go by if the location of the safe was not in a crowded area. But also in Buelton, Calif., 30 miles south of Santa Maria, A. Andersen has proved that an all-electric cafe is a success.

A. Andersen, topped by his electric sign telling passersby that his is an electrical cafe throughout. The cafe is located in Buelton, Calif.

Andersen's Electrical Cafe, as it is known, is located on one of the chiefly traleved highways of the state. Its electric sign, placed attractively in full sight of all travelers, is an invitation to the traveling public to eat in a well equipped, clean, wholesome cafe, with food cooked well in the most modern manner by electrical equipment. Moreover, the invitation is followed up by just those very qualities in every detail.

Included in the equipment of the cafe is a Standard combination range and steam table of 20.6-kw. capacity; a Hotpoint automatic water heater, 5-kw.; a Hotpoint fry griddle, 3-kw.; a Hot-

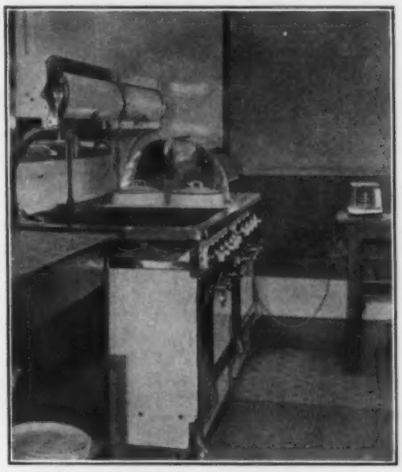


Night-time greasing of automobiles or trucks is made possible at the Hazelwood Service Station, Fresno, by good illumination. These photos show the effect produced, and the units themselves by which the pit is illuminated, embedded in the concrete curbing surrounding the pit.

point hot plate, 3.8-kw.; a Hotpoint coffee urn heater, 1.1-kw.; and a Strite automatic toaster, 5.5-kw.

Mr. Andersen also runs a soda fountain in connection with the cafe, in which he has three refrigerator cabinets, all cooled from a central Frigidaire electric refrigeration unit.

Formerly known as Andersen's Cafe, Mr. Andersen decided to change his electric sign to Andersen's Electrical Cafe at the time he installed all the electrical equipment, so that the advertising value of the installation might be used to attract the weary traveler in search of a first-class eating place. Mr. Andersen formerly was connected with the dining-room department of the Biltmore Hotel in Los Angeles, during the first seven months it was opened, and so appreciated the value of this fact from an advertising standpoint. He also formerly was connected with the Plaza Hotel in New York.

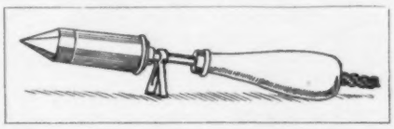


Inside Andersen's Electrical Cafe in Buelton, Calif., the combination electric range and steam table is placed in the window where all who pass may see.

One feature of the installation is the location of the range in the front window of the cafe where it may be seen by all passersby, enticing in its cleanliness.

Cotter Pin Supplies Support for Soldering Iron

An ingenious shop "kink" was given all users of electric soldering irons recently by Donald McLean, of Cleveland, and should prove handy to many contractors in their shops here. It is an idea that is simplicity itself but is one of the handiest tricks ever brought to their attention. Furthermore it is a device that costs practically nothing and not only adds to the general safety of the shop but also to its efficiency and practicability.



A cotter pin, cut off at the ends and slipped over the shank of an electric soldering iron, provides a safe and handy rest for it.

Mr. McLean took a large cotter pin and cut it off about one-half inch from its end. He fitted it around an electric soldering iron between the handle and the point. This provides a good rest for the iron when laid aside or when heating up. It also permits keeping the point clean and lessens the chance of it falling off on the floor. In this way the man handling the electric soldering iron need not worry should he happen to leave the current on for fear that the iron might start a fire, and when he comes back to continue the job he need not go to the trouble of wiping off a lot of lint or other dirt which the iron has accumulated by falling on a work bench or on to a floor littered with droppings usually found around a shop.

Large Number of Lamps Used in Theater-Sign Installation

There are 8,538 lamps used in signs on the Metropolitan Theater in Los Angeles. Several of these are shown in the accompanying illustration. The roof sign has 14 letters, is 120 ft. long and contains 1,521 25-watt lamps. The vertical sign on the right (over the main entrance) is 54 ft. from top to bottom and contains 1,176 10-watt and 644 50-watt lamps, 10-watt lamps being used in the border and 50-watt lamps in the letters.

Electric signs on this theater contain 8,538 lamps totaling 183 kw.

The vertical sign on the left is 62½ ft. high and 5 ft wide. It contains 1,268 10-watt lamps in the border and 550 50-watt lamps in the letters. In addition to the signs shown, there is a vertical sign over the Broadway entrance which is 62½ ft. high, containing 1,568 10-watt lamps in the border and 608 50-watt lamps in the letters. Various other signs on the marquise contain 698 25-watt lamps and 505 10-watt lamps. The total connected load of the signs is 183 kw. The entire installation was made by the Electrical Products Corporation of Los Angeles.

Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be sent to the Editor, Journal of Electricity, 883 Mission Street, San Francisco.

Q. 1. What is the proper mixture of concrete to use in making a foundation for a motor?—J.T.R.

A. One part Portland cement, two parts clean, sharp sand and four parts or rock make a good mixture. Sand should be free from vegetable matter and rock should have all dirt washed from it before use.

Q. 14. Can you give a table showing amperes per horsepower, in relation to efficiency, of d.c. motors?—E.M.W.

A.

Efficiency of Motor Volts	75% Amp.	80% Amp.	85% Amp.	90% Amp.
At 110	9	8.4	7.9	7.5
At 220	2.5	4.2	3.95	3.75
At 500	1.98	1.86	1.75	1.66

Q. 3. Please give the data pertaining to standard plow steel hoisting rope of 1-in. diameter.—A.G.L.

A. Diam.=1 in. Cir.=3 in. Wt. per ft.=1⅝ lb. Strength in 2,000-lb. tons =38. Working load in 2,000-lb. tons= 7.6. Diam. of drum or sheave to use= 4 ft.

Q. 6. What is the formula for expressing reactance?—H.E.J.

A.

$$X = 2\pi f L$$

Where: X = reactance
L = inductance (henrys)
f = frequency (cycles)
$\pi = 3.1416$

BETTER MERCHANDISING

Glendale Electric Store Wins June-Bride Contest

Judges Find Difficulty in Selecting Winners from Fine Window-Display Photos Submitted in Competition

In one of the closest competitions on record the J. A. Newton Electric Company, of Glendale, Calif., won the first prize in the June-Bride window-display contest conducted by the California Electrical Bureau recently, it was announced by Victor W. Hartley, executive secretary. The Central Electric Company of Watsonville was a close second, and the McNally Company of Pasadena won third prize.

The prize winners and the amounts won in the contest are as follows:

1st. J. A. Newton Electric Company, Glendale $50
2nd. Central Electric Company, Watsonville 25
3rd. The McNally Company, Pasadena 20
4th. E. A. Kneip Electric Company, Lancaster 15
5th. Newbery Electric Corporation, Los Angeles 10
6th. Chamberlain Electric Company, Santa Paula 5

In addition to these, a special consolation prize of $2.50 was given to the Foote Electric Company at Grass Valley in recognition of the closeness with which it pursued the prize winners.

Honorable mention was given to the following entries in the very close race:

Valley Electric Company, San Luis Obispo
R. Barcroft & Sons, Inc., Merced
Levy Electric Company, San Francisco
Smith Electric Company, Glendale
Merced Hardware Company, Merced
Acme Electric Company, Bakersfield
Fisher Electric Company, Chico
Valley Electrical Supply Company, Fresno.

Better Quality Noted This Year

"There were two outstanding features in the June-Bride campaign this year," said Mr. Hartley, in commenting upon the campaign. "First—the extensive use which was made of the poster, reports from the various power-company managers stating that at no time in the past has there been so nearly a 100 per cent appearance of June-Bride posters in windows as there was this year. Second—the quality of the window displays as evidenced by the photographs received and comments which have come in from the field."

The judges in the contest declared that it was with difficulty that they could arrive finally at a decision as to which were to be selected as the best and be awarded prizes. Representing unbiased judgment in the selection of the prize-winners were the three judges appointed by the bureau for the contest for they were the officers of the San Francisco Chapter of the Window Display Managers' Association.

Letters Report Fine Results

Nearly all contestants, in submitting their pictures for the contest, commented upon the gratifying sales results achieved by the use of the windows during the campaign. One prize-winner, in an enthusiastic letter to the secretary of the Bureau printed elsewhere, declared that he has been asked by his townspeople to repeat the window display which won the prize so that they may view it again.

In commenting on his window, W. S. Hunter of the J. A. Newton Electric Company, winner of first prize, said that the object he sought was to avoid the use of a figure in his window, trying rather to give the impression of the breakfast room as the June Bride should find it upon her return from the honeymoon. She should find her breakfast table completely set up with electrical necessities," he wrote.

The winner of the second prize, the Central Electric Company of Watsonville, sent in colored photographs of the window to show color effects produced. A description of the window says: "The floor was covered with pink crepe with a border and trail of crepe rose leaves (pink). The bell consisted of white crepe rose leaves and hung suspended over the bride. The background near the bride consisted of ferns interwoven with roses."

Prize Brings Happiness to Lancaster Dealer

The whole town of Lancaster, Calif., shares in the joy of Mr. and Mrs. E. A. Kneip, electrical dealers, who won the fourth prize in the June-Bride window-display contest sponsored by the California Electrical Bureau. Upon receipt of the prize Mr. and Mrs. Kneip wrote the following enthusiastic letter to Victor Hartley, executive secretary of the Bureau. It speaks for itself.

E. A. KNEIP
Plumbing—Heating—Hardware—Electric
Lancaster, California,
Aug. 3, 1926

Calif. Electric Bureau,
San Francisco, Calif.

My Dear Mr. Hartley: We are in receipt of the check you sent us ($15) for the fourth prize in the window-display contest. My dear Mr. Hartley, you cannot guess how gratified we feel over this, of the appreciation of our effort. This small town of Lancaster has talked of it for a week and feels that you have recognized the town. Half of the people here have come in and personally congratulated us, and so we share our pleasure with you. The winning of a prize gives a great incentive to making greater efforts in the future. We have been requested to put the exhibit in the window again. We shall always play up the electric displays with the happy feeling that somebody, big and fine and unbiased, has paid attention to the smaller dealers. I am enclosing you a copy of the local paper. If you print the prize winners in any publication, will you please mail us one? I am already laying plans for another good window. Thanking you and with sincere appreciation,

Respectfully,
E. A. and MRS. MARIE KNEIP.

P.S.—Mr. Tudor, Edison manager here, made a copy of your letter and sent it to the main office, and a personal letter of thanks and congratulations.

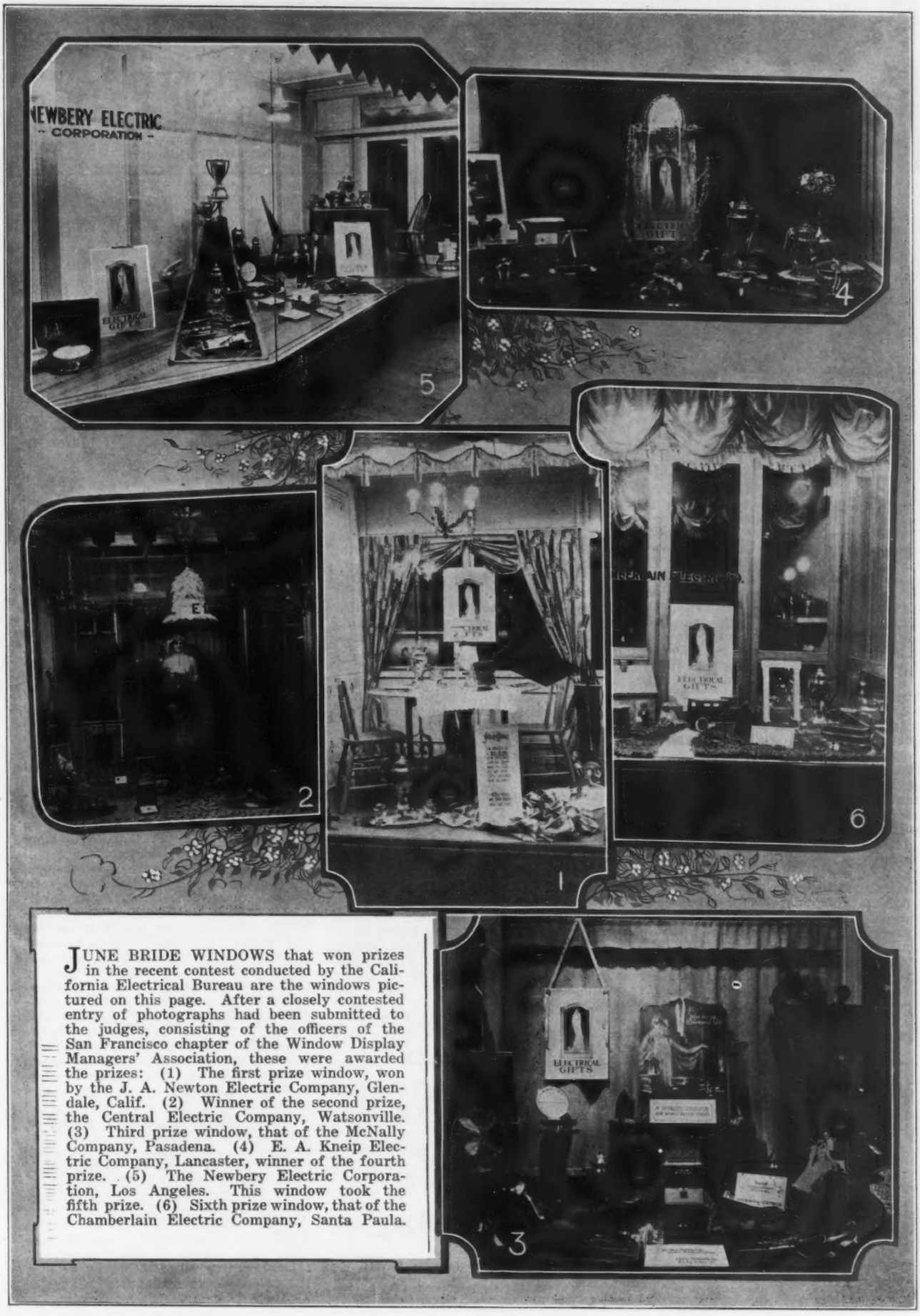
Strengthened Merchandising In New Policy Set-Up

More intensified selling has resulted from changes in the merchandising organization of the B. C. Electric Railway Company, Vancouver. The electrical appliance selling has been placed in the hands of a committee of three: J. Priestman is in charge of the outside salesmen; W. E. Dawson is superintendent of the retail stores and stock; while T. C. Bosley is the third member of the committee, representing the vice-president's department. The committee works under the supervision of E. E. Walker, sales engineer.

The new committee resulted from the expanding sales efforts of the company which required a separation from the general light and power contract business. Mr. Priestman, formerly assistant to E. E. Walker, sales engineer, carried on new business activities as well as the direction of the salesmen.

The B. C. Electric Railway Company is at the same time expanding its chain of stores. Recently better premises have been obtained in New Westminster, and a new store has been opened at Chilliwack. The greatest move is to take place in 1927 as a result of the recent purchase of a prominent downtown location in Vancouver. A short time ago the company announced the purchase of a property at the corner of Dunsmuir and Granville Streets, 50 x 120 ft. in size, for $275,000.

The present leases have until July 1, 1927, to run, and while the company's intentions have not been announced definitely, it is expected a modern store building for both electric and gas appliances will be erected on that site. This will be a great aid to merchandising as the company's main store in Vancouver at present is at the rear of its interurban station and in the wrong locality of the city.



JUNE BRIDE WINDOWS that won prizes in the recent contest conducted by the California Electrical Bureau are the windows pictured on this page. After a closely contested entry of photographs had been submitted to the judges, consisting of the officers of the San Francisco chapter of the Window Display Managers' Association, these were awarded the prizes: (1) The first prize window, won by the J. A. Newton Electric Company, Glendale, Calif. (2) Winner of the second prize, the Central Electric Company, Watsonville. (3) Third prize window, that of the McNally Company, Pasadena. (4) E. A. Kneip Electric Company, Lancaster, winner of the fourth prize. (5) The Newbery Electric Corporation, Los Angeles. This window took the fifth prize. (6) Sixth prize window, that of the Chamberlain Electric Company, Santa Paula.

NEWS OF THE INDUSTRY

"Housewives" Bill to Be Voted on in Oregon at November Election

Through a ruling of the supreme court of Oregon respecting the number of signatures required on initiative petitions to entitle them to a place on the ballot on the November election of this year, the so-called Hydroelectric Bill sponsored by the Housewives Council, Portland, will be voted on at that election. The opinion of the court, written by Justice Belt, reverses the opinion of the attorney-general, on which Secretary of State Kozer based his decision to deny the bill a place on the ballot. The court ruling was the outcome of mandamus proceedings brought against the secretary of state by the Housewives Council.

The controversy in the case grew out of interpretation of the law which states that the number of signatures on an initiative petition shall be equal to eight per cent of the votes cast for justice of the supreme court at the last general election. The situation was complicated this year by the fact that in the last election there were three candidates for supreme judge, two of whom were to be voted for. Attorney-General Van Winkle had contended that the proper basis of computation was to add the total vote received by all three candidates and divide by two to arrive at an estimation of the total number of voters voting for supreme judge. Eight per cent of this figure was 14,550, and because the "Housewives" petition bore the verified signatures of only 13,773 legal voters, its adequacy was denied. The opinion of the court interpreted the initiative law to mean, "Eight per cent of the greatest number of votes any candidate (for chief justice) received," and on this basis a sufficient number of signatures to an initiative petition would be 12,760.

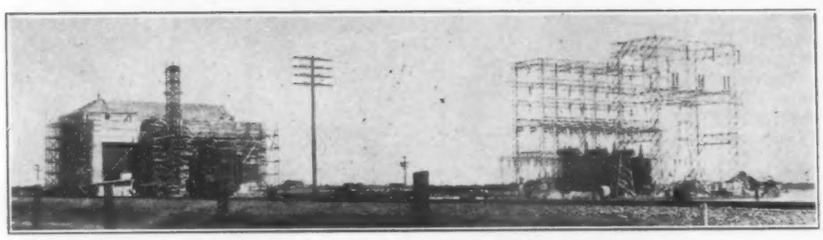
Admitting its action to be arbitrary, the court, in its opinion, said: "Election laws should be liberally construed. The great constitutional privilege of a citizen should not be taken away by a narrow or technical construction of a law regulating the exercise of such right." Further, it stated: "It is conceded that this construction is not free from criticism, but the basis selected will at least tend toward clarity and give operative effect to the law under consideration."

As is generally known, the Housewives Hydroelectric Bill would pave the way for the state to go into the power business, bonding it up to five per cent of its assessed valuation, or about $50,000,000.

Edison Company Builds 26-Mile Tie Line in One Month

A 26-mile tie line between the lower Kern River No. 1 hydroelectric plant, about 18 miles northeast of Bakersfield, Calif., and Vestal substation south of Porterville, was completed July 31, according to George C. Ward, vice-president in charge of construction and operation, Southern California Edison Company. Energy generated on the lower Kern River thus is made available to San Joaquin Valley consumers.

Late in June of this year it became apparent to the Edison company that steps must be taken to furnish an additional supply of 60-cycle energy to the San Joaquin Valley. All other Edison territory now is using 50 cycles. Realizing that the installation of additional frequency-changer capacity at Vestal substation could not be accomplished in time to help the situation this summer, plans immediately were made to construct a line which would make it possible to divert the energy generated in Kern River No. 1 plant at 60 cycles directly into the valley. To do this it was necessary to build six miles of line from the power plant to the right-of-way of the new 220-kv. Vincent transmission line now under construction, and to bring to immediate completion approximately twenty miles of this Vincent line, extending north to the intersection of this line and the line connecting the upper Kern River plant near Kernville and Vestal substation. Experienced crews of line construction men from all parts of the Edison system were brought immediately into the valley to reinforce the regular maintenance crews of this territory, and on the first of July actual work was started. The line now is energized at 60 kv.



The Wilson substation of the Great Western Power Company of California near Merced, the terminus of the Brighton-Merced 220-kv. tie line, as it appeared July 29. The station was placed in operation July 6, but the building and certain parts of the equipment had not been completed. The entire substation is expected to be entirely finished early in September.

Denver to Make Separate Issues of Franchise and Rates

After a period of practically five months the statistical work in connection with Denver's valuation of the Public Service Company of Colorado's property in that city and neighboring towns has about been completed. Indications are that the company's application for a franchise renewal will be placed before the people at a special election to be held early in October.

Ray E. Palmer, electrical engineer of New York City, in charge of the work, has been retained by the city in an advisory capacity and is expected to render his report by the middle of August.

September 21, one week after the city's fall primary election, was set tentatively as the date of the franchise election, it being the desire of both the executives of the company and of city officials to divorce it from the political element of the primaries. While it is still the intention to decide the issue apart from the primary election the mass of details has delayed the franchise election date.

The franchise will be covered separately from the rate question, although the two will be considered as a unit and one will not be adopted without the other. The franchise will cover only the questions of extensions, service, operation and such matters. Rates will be established by an ordinance as provided in the state constitution, and the rates to be set in the ordinance will be published in advance. Thus the ordinance will not be adopted unless authorized by the taxpayers by their favorable vote on the franchise. Commenting on this method of handling, the chairman of the councilmanic committee said: "We will cover the rate question separately from the franchise by municipal ordinances, although the two will be interlocking and one will not be adopted without the other. In this manner the franchise will cover only the questions of operation, service, extensions and similar questions. The rate-making ordinances will establish the rates. This method of control is that provided by the state constitution. By handling the situation in this way the right to change the rates at any time revision may be necessary will be reserved to the people. Then in later years if a change is found necessary, action may be taken either by vote of the people on an initiated ordinance or by the city council."

New Quarters in Los Angeles Occupied by Pacific States Electric Company

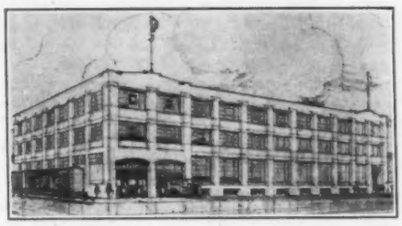
The steady growth of the electrical industry on the Pacific Coast, in general, and of the Pacific States Electric Company, in particular, is emphasized by the rapid expansion of that company which has announced, almost simultaneously, its occupancy of new and larger quarters in Los Angeles and its preparations for a new and larger building in San Francisco.

The new location of the Los Angeles quarters is 385 East Second Street at Central Avenue where open house was held on Monday, Aug. 9. The new location is much more convenient for the wholesale trade for, while it is still in the downtown district, it is removed from the traffic congestion and is much more accessible than the former location at 236 South Los Angeles Street. Offices and warehouse

The new headquarters of the Pacific States Electric Company in Los Angeles.

occupy a five-story building. Stock rooms have been enlarged to meet the demands of the electrical contractors, and larger counter service has been installed. Greater office space tends to increase the efficiency of the entire organization. Frank J. Airey is Los Angeles district manager and C. H. Thrane district sales manager.

In San Francisco the company has entered into a long-time lease under which there will be built, according to its specifications, a three-story-and-basement, fireproof building at the southwest corner of Bryant and Tenth Streets, at an estimated cost of approximately $500,000. It will have a frontage of 295 ft. on Bryant Street and 120 ft. on Tenth Street, with spur track facilities. The building, of the most modern type and equipment, will have a number of novel features in the design of stock rooms, counters, offices and similar equipment. San Francisco being the headquarters of the Pacific States Electric Company, this new building will house not only the San Francisco district offices but also the office of D. E. Harris, president, H. R. Noack, vice-president, and S. B. Anderson, vice-president and treasurer, and the company's general organization.



Artist's drawing of the new building to be erected at Tenth and Bryant Streets in San Francisco for the Pacific States Electric Company.

The Pacific States Electric Company now is located at 575 Mission Street, but upon completion of the new building, which will be occupied exclusively by that company, the old quarters will be given up. F. C. Todt is the San Francisco district manager.

The changes announced are in line with the consistent policy of expansion followed by the Pacific States Electric Company which in 1925 opened new branches in San Diego and Long Beach, Calif., and in Phoenix, Ariz. During that year also the company moved into larger quarters, built to its specifications, in Oakland, and only recently has opened a complete new warehouse and offices in Spokane, Wash. This year the Portland offices were entirely remodeled and enlarged. In all, the Pacific States Electric Company now maintains nine district and branch offices.

Citizens Vote to Sell Municipal Power Plant to Utility

The municipal electric light and power plant of the town of Green River, Utah, has been purchased by the Utah Power & Light Company. Sept. 1 is the date upon which the transfer becomes effective. A total of about 200 customers are served by this plant, which never has been a financial success under municipal ownership. The plant, which is located on the Green River about six miles north of the town, was built about twelve years ago.

As a result of the vote of the citizens on the question of selling the plant, forty-seven votes were cast in favor of the sale, with only three in opposition.

California Properties Acquired by W. B. Foshay Company

Announcement has been made of the acquisition by the W. B. Foshay Company of Minneapolis, with offices in Portland, Ore., St. Paul, Chicago and New York City, of the Alturas Light & Power Company, the Fort Bragg Light & Power Company, and the Mendocino Light & Power Company, located in lumbering and dairying districts of northern California. These companies serve electricity at retail to the cities and towns of Fort Bragg, Mendocino, Alturas, Caspar, Little River, Albion, and wholesale to the town of Cedarville. The oldest company in the group began business twenty-two years ago. Electricity is obtained by generation at hydroelectric plants and through favorable long-time purchase contracts.

The three properties will be consolidated into a new California corporation to be known as the Peoples California Hydro Electric Corporation, which in turn will be controlled by the Peoples Light & Power Corporation, a utility company owned and operated by the Foshay company, through which the latter controls its utilities. The Peoples Light & Power Corporation owns and operates utilities in Iowa, Minnesota, Wisconsin, Oregon, Washington, Vermont and Arizona, as well as California.

It has been the policy of the Foshay organization to retain the management and employees of all properties or companies taken over by them, insofar as it is possible. The company attributes much of its success to this policy as it maintains the important contact between the public and the company which makes for good will and keeps within the organization those who have been responsible for building up the business.

Work Being Rushed on Chelan Power Development

Work is being rushed on The Washington Water Power Company's Chelan power project (Journal of Electricity, July 1, 1926, p. 30) where more than 600 men are working in three shifts in each 24 hours. On July 7 a total of 980 ft. of the main tunnel had been driven. Of this progress 290 ft. was at shaft No. 1, 100 ft. at shaft No. 2, 520 ft. at adit No. 1 and 70 ft. at adit No. 2. The tunnel at the two shafts is in loose gravel and must be timbered. The railroad spur, which connects with the Great Northern Railway line along the Columbia River, had been built about 2,200 ft. toward the power station site. The permanent bunk house to be used by The Washington Water Power Company's engineers was practically completed, and an inter-camp telephone system had been installed.

Contract for the generator and lightning arresters has been awarded to the General Electric Company, and the Westinghouse Electric & Manufacturing Company has received the contract for four transformers and necessary oil switches. The William Cramp & Sons Ship and Engine Building Company will supply turbine water wheels and accessories, and this equipment will be delivered early in 1927.

The first unit to be installed in the power station will be rated at 32,000 hp., and the ultimate installed capacity will be 128,000 hp.

Late C. A. Luckenbach's Successor Named by Corporation

At the regular meeting of the board of directors of the Los Angeles Gas and Electric Corporation, held recently, the vacancies caused in the offices of third vice-president, treasurer and director by the recent death of C. A. Luckenbach were filled. W. E. Houghton, who for many years has been the comptroller of the company, was chosen as third vice-president and treasurer. In his new office Mr. Houghton will have charge of the general financing and accounting for the corporation.

H. L. Masser, gas engineer for the company, was elected to fill the vacancy on the board of directors. He will continue to serve the company in his present capacity as gas engineer. Mr. Masser was formerly on the engineering staff of the California Railroad Commission and is recognized as one of the foremost utility engineers in the country.

Two Distribution Stations Put in Service by Utility

Two distribution substations recently placed in service by the Southern California Edison Company, Los Angeles, are the Monrovia and Howard substations.

The Monrovia station, which serves the cities of Monrovia and Arcadia and the surrounding territory, has a capacity of 3,000 kva. at 4 kv., with full automatic reclosing equipment on the 4-kv. feeders. It is fed by two 16-kv. circuits. Transformers and 16-kv. equipment are outdoors, while the 4-kv. regulators and the automatic reclosing equipment are housed in the building.

The Howard substation serves a section known as Athens south of Los Angeles. This is a station of the outdoor type with a capacity of 1,500 kva. at 4 kv. The steel structure and equipment for the incoming 16-kv. line, transformers and 4-kv. bus is permanent, and provision has been made for an additional 16-kv. line and for larger transformers when the need arises.

Grain Company Loses Damage Suit Against Power Company

Decision in the suit brought by Balfour, Guthrie & Company, against the Great Western Power Company of California for $619,000 has been rendered in favor of the power company. The suit was the outcome of a fire at Port Costa, Calif., in September, 1924, in which a quantity of grain, hay and feed belonging to Balfour, Guthrie & Company and stored in warehouses there was destroyed. The company sued on the grounds that the power company's transformers caused the fire. A previous trial resulted in disagreement of the jury.

In the trial just closed twelve weeks were consumed in the taking of evidence before the superior court in Oakland, Calif. Another suit in which Balfour, Guthrie & Company claimed $224,000 for damages to buildings is still pending.

Utility Equips Special Car for Radio Interference Work

In its efforts to combat radio interference the San Diego Consolidated Gas & Electric Company has fitted up a radio interference service car. It is equipped with all instruments necessary to the location of power interference, including a portable superhetrodyne set, a two-tube receiver and a sledge hammer. The "super" is a six-tube portable Radiola (Model 26) equipped with a filament voltmeter and milliammeter in the plate circuit of the last tube. The two-tube set (detector and one stage of audio) operates on a 10-in. loop and is used after the "super" fails to give further accurate bearings. The sledge hammer is used to jar a pole suspected of being near the source of interference. If such is the case the disturbance will be noted in the receiver. Fred M. Pierce is the company's radio interference expert.

This car equipped with the necessary instruments is used by the San Diego Consolidated Gas & Electric Company in its radio interference service. Fred M. Pierce, standing beside the car, is the company's radio interference expert.

Awarded Two Prizes for Saving Life of Companion

Two-fold recognition has been bestowed upon James G. White, employed as equipment sub-foreman by the Western Electric Company, Vancouver, Wash., for saving the life of Charles M. Benham. He has been awarded the American Red Cross first prize for first aid and the Vail medal, conferred by the American Telephone & Telegraph Company upon employees of the Bell system for acts of heroism.

Mr. White and Mr. Benham were installing a radio aerial on the roof of an apartment house at Vancouver when the lead wire, held by Mr. Benham, came in contact with a high-voltage circuit. Mr. Benham fell unconscious on the edge of the roof. Failing to remove the wire by means of a handkerchief and receiving a severe shock in the attempt, Mr. White obtained a broom from below, stood on the wet metal roof ledge and broke the contact. The injured man was so severely burned that both arms had to be amputated.

Refrigerator Company Increases Production Facilities

In order to take care of the increased demand for its products the Electric Refrigeration Corporation has found it necessary to increase its production facilities, and to that end has purchased a 35-acre tract of land in Detroit upon which a new factory will be built.

The first unit will be a reinforced concrete 3-story sprinkled factory building 440 x 640 ft. with approximately 600,000 sq.ft. of floor space. A 4-story administration building 200 x 55 ft. also will be built at the same time. Both buildings are to be completed and ready for occupancy Feb. 1, 1927. The total cost of land, buildings and equipment is estimated at $5,000,000.

The manufacturing operations of the Kelvinator and Nizer divisions will be consolidated in this plant.

In addition to the new Detroit plant, an expenditure of $1,500,000 has been authorized for the enlargement of the Leonard refrigerator factory at Grand Rapids, which will bring its annual production up to 500,000 ice cabinets.

Upon the completion of this building and enlargement program the Electric Refrigeration Corporation expects to have a yearly production capacity of 1,000,000 units, comprising household and commercial automatically operated electric refrigerating machines, both self-contained and separate, ice-cream cabinets, milk-cooling electric refrigerators and ice cabinets.

Developed Water Power in U. S. Increased 11 Per Cent Since March, 1925

The amount of developed water power in the United States has increased about 11.5 per cent since March, 1925, according to the Department of the Interior, through the Geological Survey, which has just issued a report on the subject as of Jan. 1, 1926. This report shows that the capacity of water wheels in plants of 100 hp. or more on the first of this year was 11,176,596 hp., an increase of 1,138,941 hp., or about 11.5 per cent.

The total capacity in horsepower of water wheels in water-power plants in the United States for different years was as follows: 1908, 5,339,391; 1921, 7,926,958; 1924, 9,086,958; 1925, 10,037,655; 1926, 11,176,596. In the 17 years since 1908 the capacity of water wheels in water-power plants has more than doubled.

California, for years second in amount of developed water power, is now the leading state, with 1,834,980 hp. in water-power plants, and New York, with 1,750,391 hp., drops to second place.

The accompanying table, based on data published by the Geological Survey, shows for different years the rank of the ten states leading in developed water power.

Rank of the Ten Leading States in Developed Water Power for Different Years

STATES	1908 Rank	1908 Per Cent of U. S. Total	1921 Rank	1921 Per Cent of U. S. Total	1924 Rank	1924 Per Cent of U. S. Total	1925 Rank	1925 Per Cent of U. S. Total	1926 Rank	1926 Per Cent of U. S. Total
New York	1	16.6	1	16.3	1	17.0	1	17.1	2	15.7
California	2	8.7	2	14.5	2	16.0	2	15.3	1	16.4
Maine	3	6.4	4	5.7	4	5.2	6	4.7	7	4.4
Pennsylvania	4	5.4								
Massachusetts	5	4.9	6	4.3	10	3.8	10	3.4		
Oregon	6	4.3								
Wisconsin	7	4.1	7	4.2	6	4.4	7	4.1	8	4.0
South Carolina	8	3.9	8	4.2	8	3.9	5	5.1	6	4.6
Michigan	9	3.8								
New Hampshire	10	3.4								
Washington			3	5.7	3	5.3	3	5.6	3	5.9
Alabama									4	4.8
North Carolina			9	4.2	5	4.7	4	5.3	5	4.8
Georgia			10	3.5	7	4.0	8	3.9	9	3.9
Montana			5	4.3	9	3.8	9	3.6	10	3.4
Total		61.5		66.9		68.1		68.1		67.9

Well Known Electrical Man Forms Manufacturing Company

James R. Kearney, well known in the electrical industry, has announced the organization of The James R. Kearney Corporation, manufacturer of utility equipment. Operation will commence immediately at the company's plant, 4224-32 Clayton Avenue, St. Louis.

The formation of the new corporation comes after Mr. Kearney's many years of experience in the electrical industry. He first gained experience

JAMES R. KEARNEY

with the Topeka (Kansas) Edison Company as a groundman and lineman and rapidly was promoted to superintendent of line construction, engineer of construction and engineer of installing plants. Later he joined the W. N. Matthews Corporation, St. Louis, as salesman. He became a special representative, was placed in charge of sales west of the Mississippi, then in charge of sales west of Pittsburgh, and then in charge of sales in the United States. At the time of his resignation he was vice-president, a director and sales manager of electrical sales in the United States, Canada, Cuba and Mexico.

New Lighting School Sponsored by Illuminating Engineers

A lighting school in which the sessions have been boiled down to five and which will cover the field presented in the former lighting schools conducted by the lighting committee of the Commercial Section, Pacific Coast Electrical Association, with other more recent data included, is to be put on during the week of Sept. 20 under the auspices of the Illuminating Engineering Society, San Francisco Bay Cities chapter. The school will be held in San Francisco and will be under the direction of Clark Baker, assistant manager, National Lamp Works, Oakland, president of that chapter of the I.E.S.

Mr. Baker was responsible for the former lighting schools and has arranged the course on this occasion so that it can be presented in fewer and more concentrated lessons.

The sessions will be divided as to evening and afternoon classes. Three of the classes will be held in the evening and two in the afternoon, providing a fifty-fifty division of time devoted to the study between employee and employer.

As in the former schools, a registration guarantee of $10 will be required from each enrolled student, to be refunded at the rate of $2 for each class attended. This may be advanced by either the employee attending the classes or by the employer who sends him to them.

A high grade of useful working information upon the very best practice in planning and figuring lighting installations is to be presented.

Water and Power Act Has No Bearing on Boulder Canyon Dam.—The proposed California Water and Power Act recently was denounced by the president of the Boulder Dam Association who stated that the act has no bearing whatever on the building of the Boulder Dam nor on any other proposed development of the Colorado River. The Boulder Dam Association is composed of representatives of civic and other organizations in Nevada, California and Arizona communities who favor the erection of a high dam at Boulder Canyon on the Colorado.

Project in Alpine and Tuolumne Counties, Calif., Licensed.—To Emma Rose, Anna G. Lane and Hobart Estate Company, of San Francisco, a license for twenty-five years for a project on Highland Creek in Tuolumne and Alpine Counties, Calif., partly within the Stanislaus National Forest, has been granted by the Federal Power Commission. A dam about 80 ft. in height will be built across Highland Creek, forming a reservoir of about 9,000 acre-ft. capacity, to be known as the Spicers Meadows Reservoir. This storage of water is necessary to provide for future growth in domestic and irrigation requirements and to augment the water supply to the applicants' existing power plants. The power proposed to be developed will be used in mining and public-utility service.

Progress of Moffat Tunnel.—Recent report of progress on the Moffat Tunnel gave the following figures: pioneer tunnel, east portal, 15,459 ft., west portal, 12,413 ft., leaving 4,511 ft. between the headings; main tunnel, east portal, 14,868 ft., west portal, 12,038 ft. The railroad tunnel has been enlarged to full size, 13,239 ft. at the eastern end and 6,760 ft. at the western end. The upset price of $6,720,000 laid down by the Colorado legislature in 1922 as the cost of the tunnel has been exceeded through unforeseen difficulties in boring, and a $3,500,000 loan recently was negotiated. This is the second supplemental loan, the first having been for $2,500,000. Much of the added cost is chargeable to timbering required by the nature of the work encountered and by other normal developments of the work.

Small Utility Sells to Pacific Gas and Electric Company.—The Bell Electric Company, which has been selling and distributing electricity to retail consumers in the city of Auburn, Calif., and adjacent unincorporated territory, has been authorized by the California Railroad Commission to sell its property to the Pacific Gas and Electric Company. The rates charged by the Bell company will remain in effect pending a study of the situation by the commission's engineers.

Contract Let for Three Largest Turbines Ever Built

The three largest hydraulic turbines in point of physical dimensions ever constructed will be furnished by the I. P. Morris department of The William Cramp & Sons Ship and Engine Building Company, Philadelphia, for the Philadelphia Electric Company's power development at Conowingo on the Susquehanna River. The contract recently let specifies three 54,000-hp. vertical-shaft turbines, which will operate at a speed of 81.8 r.p.m. under a head of 89 ft.

The water entering the turbine casing will pass through large valves of the butterfly or pivot type, the internal diameter of these valves and of the entrance to the turbine casing being 27 ft. The runners or rotating elements of the turbines will be of cast steel built in sections and will have an outside diameter of 17 ft. 9 in. Some idea of the size of these water-wheel units may be gained from the fact that the horizontal over-all distance across the plate steel casing will be 62 ft. and successive units will be spaced apart a distance of 72 ft. from the center of one unit to the center of the next.

Company Reports Good Progress in Construction Program

The 1926 construction program of the Coast Valleys Gas & Electric Company, Salinas, Calif., is well under way. Included in the progress reported is the new Carmel substation which, together with practically all of the electrical installation, is complete but cannot be placed in service until new transformers are installed at Monterey. The new Monterey substation building is practically complete and ready for the electrical equipment. Both stations are to be equipped with automatic reclosing switches throughout.

Increased transformer capacity has been installed and placed in service at Moro Cojo, Hilltown and Gonzales stations, as have also new voltage regulators at King City.

Surveys are under way for the proposed second 55-kv. circuit from Soledad to King City which it is planned will be constructed this fall. The tap lines to loop the second 55-kv. line into the Salinas substation have been completed and put in service so that now the entire switching control of the company's transmission system centers in this station.

Supply of Electricity in Japan Exceeds Demand.—The supply of electricity in Japan steadily is becoming more than the demand, according to Denkinotomo. This situation is attributed to the fact that the shortage of power a few years ago caused the development of a large number of power projects, which now are about completed, while the present general industrial depression has resulted in a much smaller demand for power than was expected. In an attempt to remedy the situation the department of communications is said to have decided to take steps not to permit new applications for water-power development and also to order postponement for an indefinite period of those projects for which permits have been received but on which construction has not yet been started.

Illinois Electric Company Opens Branch in San Diego

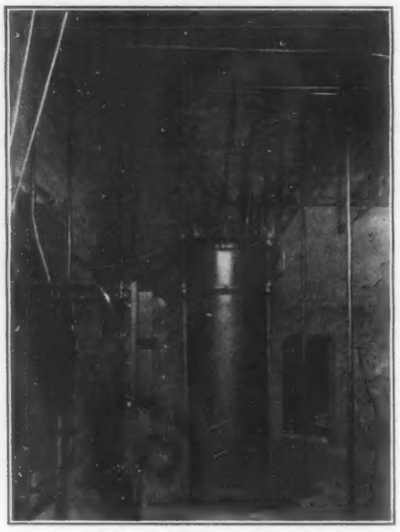
Following an established policy of better service to its customers, the Illinois Electric Company, Los Angeles, has opened a branch office at 712 Electric Building, San Diego, Calif. R. P. Wakeman, who has been associated with the Los Angeles branch for the past three years, will be in charge.

The territory covered by the new branch includes San Diego and Imperial Counties, together with adjacent territories in northern Mexico.

Marked Activity Being Displayed in Industrial Heating

Electric furnaces aggregating approximately 4,000 kw. have been installed or ordered in the Pacific Coast states during the past sixty days, according to E. A. Wilcox, industrial heating engineer and representative for the Pittsburgh Electric Furnace Company and the Detroit Electric Furnace Company.

Chief among these installations is the 3-ton-per-hour 'Lectromelt furnace purchased by the Northwest Steel Rolling Mills, Inc., Seattle. This furnace will be used for melting scrap and turning out billet-sized ingots for rolling into merchant bars and concrete reinforcing rods. It has an output of 40 tons per day. The installation aggregates 1,500 kw. and is served by the lighting department of the City of Seattle.



Transformer vault to serve electric furnace installed in George Bros. Foundry, Grass Valley, California.

A 1½-ton-per-hour 'Letromelt steel and iron furnace recently has been placed in operation in the Warman Electrical Foundry, Los Angeles. This 800-kw. installation is served by the Southern California Edison Company.

George Bros. Foundry, Grass Valley, Calif., has installed a ½-ton steel and iron furnace for making castings for the mining field in that section of the state. The installation totals 300 kw. and is served by the Pacific Gas and Electric Company.

A Detroit brass furnace with a capacity of 350 lb. has been installed by the Price-Pfister Brass Manufacturing Company, Los Angeles. This 100-kw. installation is served by the Bureau of Power and Light.

One-half-ton 'Lectromelt steel and iron furnace installed in George Bros. Foundry, Grass Valley, Calif.

Two brass furnace installations shortly will be made on the lines of the Pacific Gas and Electric Company. A 350-lb. Detroit brass furnace has been ordered by the Axford Art Bronze Manufacturing Company, San Jose, Calif. A furnace of the same type with a capacity of 250 lb. has been ordered also for the Mare Island Navy Yard. Each will have a capacity of 100 kw.

Northwest Electric Light & Power Association

Personnel of Administrative Staff Announced by President

Receiving acceptances of his appointments of section chairmen and officers of the Northwest Electric Light & Power Association for the year 1926-1927, D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake, president of the association, has announced the completion of the administrative staff.

Section chairmen are as follows: Commercial—George C. Sawyer, sales manager, Pacific Power & Light Company, Portland; Public Relations—Richard M. Boykin, manager central district, Puget Sound Power & Light Company, Seattle; Technical—F. J. Rankin, chief engineer, Idaho Power Company, Boise; Accounting—W. L. Fitzpatrick, general auditor, Mountain States Power Company, Tacoma.

Members-at-large of the executive committee, as finally revised, are A. S. Moody, Northwest manager, General Electric Company, Portland, representing the manufacturers; J. I. Colwell, Northwest manager, Graybar Electric Company, Seattle, representing the jobbers; and A. C. McMicken, sales manager, Portland Electric Power Company, Portland, representing the utilities.

The complete personnel of the executive committee includes, beside the above-mentioned, the following officers present and past: D. C. Green, president; R. B. King, superintendent, Idaho Power Company, Boise, vice-president for Idaho; W. B. McDonald, manager, Mountain States Power Company, Kalispell, Mont., vice-president for Montana; George L. Myers, assistant to the president, Pacific Power & Light Company, Portland, vice-president for Oregon; P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake, vice-president for Utah; Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle, vice-president for Washington; and Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, retiring president of the association.

The secretarial and financial affairs of the association will be in the hands of C. W. Lundquist, Utah Power & Light Company, Salt Lake City, secretary, and R. H. Jones, of the same company, treasurer.

Heading the general committee on rural electric service is Lewis A. McArthur, vice-president and general manager, Pacific Power & Light Company, Portland.

The first meeting of the executive committee for the current year was held at Portland, Aug. 9, 1926.

A.I.E.E. News

Interesting Program Planned for Pacific Coast Convention

Plans as outlined indicate that the Pacific Coast convention of the American Institute of Electrical Engineers to be held at Salt Lake City, Utah, Sept. 6-10, will be an exceedingly interesting and enjoyable meeting. The following program has been announced:

Monday, Sept. 6.

9:00 a.m. Registration at convention headquarters, lobby Hotel Utah.

10:00 a.m. Session of counselors of student branches.
Meeting of section officers of eighth and ninth geographical districts.

12:00 m. Organ recital at Tabernacle.

2:00 p.m. Opening session.
Address of welcome.
Response.
The Space Charge that Surrounds a Conductor in Corona, by H. J. Ryan and J. S. Carroll, Stanford University.
110-kv. Transmission Line Construc- of The Washington Water Power Company, by L. R. Gamble, Washington Water Power Company.
A New 220-kv. Transmission Line, by C. B. Carlson and H. Michener, Southern California Edison Company.
Effect of Unbalanced Tension in a Long-Span Transmission Line, by E. S. Healy and A. J. Wright, Electric Bond & Share Company.

2:00 p.m. Ladies' drive about city and canyons.

5:00 p.m. Excursion to Saltair—bathing, dinner and dancing.

Tuesday, Sept. 7.

10:00 a.m. The Circle Diagram of a Transmission Network, by F. E. Terman, Stanford University.
Calibration of Lichtenberg Figures, by K. B. McEachron, General Electric Company.
Fire Protection of A.C. Generators, by J. A. Johnson, Niagara Falls Power Company, and E. J. Burnham, General Electric Company.
Stability Characteristics of Alternators, by O. E. Shirley, General Electric Company.
Synchronizing Power in Synchronous Machines, by H. V. Putnam, Westinghouse Electric & Manufacturing Company.

12:00 m. Ladies' luncheon at Country Club, followed by golf on picturesque links of the Country Club.

2:00 p.m. Vacuum-Switching Experiments at California Institute of Technology, by R. W. Sorensen and H. E. Mendenhall, California Institute of Technology.
Economical Power Factor Correction, by S. H. Litchfield.
Electrical Practice in Lead-Silver Mines in Utah, by Leonard Wilson, Consulting Engineer.
Engineering Education—Its History and Prospects, by H. H. Henline, Stanford University.

8:00 p.m. Informal reception, ballroom Hotel Utah, music and dancing.

Wednesday, Sept. 8.

10:00 a.m. Protection of Oil Tanks against Lightning, by F. W. Peek, Jr., General Electric Company.
Protecting Oil Tanks against Lightning, by E. R. Schaffer, Johns-Manville Company.
Variable Voltage Equipment for Electric Power Shovels, by R. W. McNeil, Westinghouse Electric & Manufacturing Company.
Mercury Vapor Power Rectifier, by C. A. Butcher, Westinghouse Electric & Manufacturing Company.
Temperature of a Contact and Related Current-Interruption Problems, by Joseph Slepian, Westinghouse Electric & Manufacturing Company.

12:00 m. Ladies' excursion to Pinecrest Inn, at head of Emigration Canyon, for lunch.

2:00 p.m. Golf tournament on links of the Country Club.

6:30 p.m. Dinner, Hotel Utah ballroom, followed by:
Presentation of Edison Medal
Response by Dr. Ryan
Presentation of golf trophies
Music and dancing.

Thursday, Sept. 9.

10:00 a.m. Transcontinental Telephony, by O. B. Jacobs and H. H. Nance, American Telephone & Telegraph Company.
Controlling Insulation Difficulties in the Vicinity of Great Salt Lake, by B. F. Howard, Mountain States Telephone & Telegraph Company.
Carrier-Current Communication on Submarine Cables, by H. W. Hitchcock, Pacific Telephone & Telegraph Company.

12:00 m. Trip by train to Bingham and Magna, visiting the famous mine and mill of the Utah Copper Company. Lunch will be served on train.

Friday, Sept. 10.

8:00 a.m. Excursion via automobile to Utah Power & Light Company's new 30,000-kw. hydro generating station at Cutler on lower Bear River.

Saturday, Sept. 11.

8:00 a.m. Excursion over celebrated Bear Lake-Bear River development of Utah Power & Light Company by automobile.

P.C.E.A. News

Engineering Section Announces First Group Meetings

The first group meetings of the Engineering Section of the Pacific Coast Electrical Association will be held in Los Angeles Sept. 1-3, in the Los Angeles Gas and Electric Corporation Building, 810 South Flower Street. The schedule of meetings, as announced by J. G. Rollow, chairman, follows:

COMMITTEE	Sept. 1	Sept. 2	Sept. 3
Accident Prevention	10 a.m.	9:30 a.m.	
Electrical Apparatus		9:30 a.m.	9:30 a.m.
Hydraulic Power	10 a.m.	9:30 a.m.	
Inductive Co-ordination			9:30 a.m.
Meters	10 a.m.	9:30 a.m.	
Overhead Systems	10 a.m.	9:30 a.m.	
Prime Movers	10 a.m.		
Safety Rules			9:30 a.m.
Underground Systems			9:30 a.m.
Executive	6 p.m.		4:00 p.m.
Luncheon (General)		12:15 p.m.	

Headquarters will be the Gates Hotel, Sixth and Figueroa Streets, where reservations should be made direct, with mention of the Pacific Coast Electrical Association.

Purchasing and Stores Section to Meet.—The first meeting of the Purchasing and Stores Section will be held in Los Angeles Thursday, Aug. 26, and Friday, Aug. 27. Sessions will be held in the Edison Building, 306 West Third Street, and will begin at 9 a.m.

News Briefs

Vernal, Utah, Has New Street-Lighting System.—A street-lighting system in the business district of Vernal, Utah, recently has been installed by the Utah Power and Light Company. The new system consists of five 1,000-cp., four 400-cp. and thirty 100-cp. series incandescent lamps.

Utility Applies for Permission to Issue $10,000,000 in bonds.—The Los Angeles Gas and Electric Corporation has made application to the state railroad commission for authority to issue $10,000,000 of 5 per cent bonds, the proceeds of which will be used in the most part for the refunding of certain 6 per cent bonds now outstanding. The balance of the funds will be used for extensions and betterments to the system.

West Kootenay Company Starts Work on Station.—The West Kootenay Power & Light Company, Rossland, B. C., has started preliminary work in connection with the construction of another station on the Kootenay River at the point where the falls enter the Slocan pool. The heavy construction will be done at low water, in January and February, when several hundred men will be employed to rush the work through in the shortest time possible for such work.

Working Upon New Vacuum Switch at California Institute of Technology.—A new vacuum switch which eventually may do away with the necessity for the present type of oil immersion switch is being worked upon by Dr. Robert A. Millikan and Professor Royal W. Sorensen, of the California Institute of Technology, of Pasadena, Calif., working in conjunction with engineers of the Southern California Edison Company. The switch is said to be based upon the principles that a vacuum is a non-conductor of electricity. In recent tests the switch operated successfully with a load of 40,000 volts.

Utility's Request for Permission to Require Uniform Deposit Refused by Commission.—A recent request made by the Southern California Edison Company, Los Angeles, for permission to require from residence consumers not satisfactorily establishing credit a deposit of $3.50, regardless of the size of residence, has been refused by the California Railroad Commission. The company previously had required from such consumers cash deposits ranging from $1.50 for houses of four rooms or less to $5 for eight or more rooms. Based on its findings that the average monthly bills of 60 per cent of the consumers making deposits did not exceed $1.25 and that only 15 per cent exceeded $2 a month, the commission refused the request. It further cited that the company may demand a deposit of twice the size of the average monthly bill before reconnecting service discontinued for non-payment of bills. The schedule of deposits was changed to $2.50 for seven rooms or less and $5 for eight rooms or more.

News of the Electragists

Program for State Convention at Del Monte Outlined by Joint Committees

With an excellent program already well lined up and arrangements for hotel and other accommodations practically completed, the state-wide meeting of California Electragists at Del Monte, Oct. 1-2, promises to surpass all previous conventions of Electragists in worth-while discussion of problems peculiar to the contractor-dealer field as well as to provide an outing in which every feature of entertainment has been cared for.

Host and hotess were they at the recent meeting of the California Electragists, Southern Division, in San Diego. J. ("Jess") F. Zwiener and Mrs. Zwiener were especially considerate of the visiting delegates and made them all feel at home.

The Electragists of the Southern Division already are planning on a special train caravan, it is reported, and the Northern Division, not to be outdone, is planning on several special features of its own. Special committees are working on these features in each division.

A registration fee of $5 has been decided upon for the convention, the ladies being registered free this year. This should encourage Electragists to bring their wives to the convention, and indeed this is pretty generally the plan in the Southern Division in which the women folks have played an active part in many of its meetings in the past.

Rates at Hotel Announced

Arrangements for hotel accommodations also are being worked out in both divisions, the special rates given by the Hotel Del Monte having been announced recently. In each division cards or letters will be sent members by which they may make hotel reservations with hotel committees. These are expected to be in the mails shortly.

Although all arrangements are being made with Hotel Del Monte as to reservations, it is understood that for those who may prefer European plan accommodations, they will be available in Monterey not far from Del Monte. At Hotel Del Monte special rates have been given as follows, all of which are American plan:

Single room, without bath—
1 person $7.50 per day each
2 persons, $7.00 per day each

Double room, with bath—
1 person $9.00 per day each
2 persons $8.50 per day each

Two single rooms, bath between—
2 persons $9.00 per day each
4 persons $9.00 per day each

These special rates apply for one day previous to and one day after the convention so that those coming early or staying late may have the benefit of the special rates.

Shows perfect co-operation with the fire underwriters, does C. P. Chetwood who, besides being electrical inspector, is city fire chief of Greeley, Colo. He is taking L. A. Varley, chief engineer of the Mountain States Inspection Bureau, whose headquarters are in Denver, on a tour of the city and showing him that no electrical fire hazards exist in Greeley.

While all details of the program have not been finally worked out, particularly with reference to the specific titles of the talks to be presented, the program in other respects is now complete. All major topics have been assigned and in most cases the names of the speakers and their general subject have been given. From the closely knit program as outlined it may be seen that there will be something doing every minute of the convention. The tentative program planned by the California Electragists for the convention is as follows:

Tentative Program

Friday, Oct. 1, 1926

Breakfast—Hotel Del Monte, 7:45 to 9 a.m.

General session—All groups present—9:30 a.m. to 12 noon.

Opening remarks by H. H. Walker and remarks by C. Felix Butte, chairman of the Northern Division.

Report on the State Merchandising Section, prepared and presented jointly by "Kelly" Courtright and O. N. Robertson.

Report of State Estimating Section prepared and presented jointly by Earl Browne and a representative of the Southern Division Estimators' Section to be designated.

Report of State Motor Section prepared and presented jointly by Norman Nelson and Billy Hahn.

Report on special activities of Northern Division by George Eldridge.

Address by Charles T. Hutchinson, on the progress of the Red Seal plan.

Luncheon—12 to 1:30.

Afternoon session—2 to 5:30.

Closed meetings, Electragists only, of Merchandising Section, Estimating Section, Motor Section and Accounting Section.

Address—"Illumination Design for the Electragist," by Clark Baker.

Evening session—Joint meeting of division executive committees.

Saturday, Oct. 2.

Morning session—9:30.

Closed meeting for Electragists.

Golf for jobbers and manufacturers and other guests.

Election of officers.

Discussion on individual application of trade policy by Electragist membership.

Responsibility of Electragists to the industry. Leader to be designated.

Need for better business methods by individual members.

Local organization, by H. W. Barnes.

Open Forum.

Luncheon—12 to 1:30.

Afternoon session—2 to 5.

General meeting—All groups present.

Address on Red Seal Plan by D. E. Harris followed by speaker as designated by Northern Division.

Short address on recent progress of contractor-dealer under lead of the Electragists, and increasing value of the organization to the industry, Glen Arbogast, Los Angeles.

Address by A. E. Wishon.

Closing address—Speaker to be designated.

Mathews Electric Shoppe is the new firm name of the business formerly operated under the name of **Scott Electric Company**, at 800 F Street, San Diego, Calif. **Mr. Mathews** was formerly superintendent of the firm and now has taken it over.

R. E. Woods and J. P. Watkins, in other words the Woods-Watkins Electric Company of Porterville, Calif. Placed end to end these two manage to reach all around the territory.

The first Red Seal home in the city of Santa Monica now is being erected and is located at 410 Fifteenth Street. Frank Airey, district manager of the Pacific States Electric Company, Los Angeles, is the proud owner. Frank further states that the job bears the "Check Seal" label and that the G. E. wiring system is being used. **Dave Barry**, Electragist, of the **Globe Electric Company**, Santa Monica, is the contractor in charge.

Meetings

San Diego Electric Club to Hold Annual Outing

The annual outing of the Electric Club of San Diego, Calif., will be held Aug. 22 in the form of a daylight boat trip to San Pedro. The S.S. Harvard will leave San Diego at 9 o'clock in the morning, arriving at 2 in the afternoon at San Pedro, where a one-hour stop will be made. Transferring to the S.S. Yale, the party will leave San Pedro at 3 p.m., arriving in San Diego at 8 p.m. Entertainment features, including concerts and dancing, will be provided on both north and southbound trips.

All members of the electric industry in the vicinity of San Diego have been invited by the Electric Club to participate in the outing. C. D. Weiss of the San Diego Consolidated Gas and Electric Company is in charge of arrangements for this event.

Annual Picnic Given by San Diego Utility Employees.—The twelfth annual picnic of the San Diego Consolidated Gas & Electric Company's Employees Association was held at Mission Beach on July 11 with an estimated attendance of twenty-five hundred.

Contra Costa League Elects Officers.—At a recent meeting of the Contra Costa Electrical Development League held in Concord, Calif., W. S. Van Winkle, president and general manager of the Bay Point Light & Power Company, Bay Point, Calif., was elected president. Mr. Van Winkle is one of the charter members of the organization. Leo Kass was re-elected secretary. The new directors of the league are Jack Cummings, L. Stinchfield and J. McClelland.

Public Service Company Entertains Co-operative Club.—Members of the Co-operative Club and their wives, numbering 125 persons, were guests of the Public Service Company of Colorado at its Valmont plant near Boulder a short while ago. The guests, with R. G. Gentry, in charge of public relations for the company, as host, were conducted in automobiles to the plant where a picnic luncheon was served. An inspection of the power plant was followed by dancing. Open house at the plant and the encouragement of members of various organizations to make a tour of inspection is part of an educational plan of the company.

Operating Department of Public Service Company Meets

The monthly meeting of the operating department of the Public Service Company of Colorado was held at its Valmont plant July 30. V. L. Board, general superintendent, presided over the meeting, which was devoted to consideration of budgeting problems and engineering reports of the various departments.

In attendance were Clare N. Stannard, vice-president and general manager; Charles A. Semrad, vice-president and commercial manager; Guy W. Faller, vice-president; Harry T. Hughes, treasurer, and the heads of operating departments in Denver. Managers of the Alamosa, Berthoud, Brighton, Leadville, Salida, Boulder, Sterling, Fort Collins, Idaho Springs, Windsor and Lafayette districts were also present.

R. E. Burger of New York City, general manager of the public-utility division of Cities Service Company, was the principal speaker and dwelt on expansion programs being carried out by the Public Service Company of Colorado, the Ohio Public Service Company and the Toledo-Edison Company.

An inspection of the Valmont plant concluded the program.

COMING EVENTS

Association of Electragists, International—
Annual Convention—Cedar Point-on-Lake-Erie, Sandusky, Ohio
Headquarters—The Breakers
Aug. 24-27, 1926

Purchasing and Stores Section, P.C.E.A.—
Meeting in Edison Building, Los Angeles, Aug. 26-27, 1926.

Engineering Section, P.C.E.A.—
First Group Meetings Los Angeles, Calif.
Los Angeles Gas & Electric Corporation Bldg.
Sept. 1-3, 1926.

Electrical Supply Jobbers Association, Pacific Division—
Annual Convention
Empress Hotel, Victoria, B. C.
Sept. 7-9, 1926

American Institute Electrical Engineers—
Pacific Coast Convention, Salt Lake City, Utah
Sept. 7-10, 1926

Rocky Mountain Division, N.E.L.A.—
and
Colorado Public Service Association—
Joint Convention, Glenwood Springs, Colo.,
Sept. 13-16, 1926

California Electragists—
Annual State-wide Meeting—Hotel Del Monte
Del Monte, Calif.
Oct. 1-3, 1926

Book Reviews

TRANSMISSION CIRCUITS FOR TELEPHONIC COMMUNICATION

By K. S. Johnson, member technical staff, Bell Telephone Laboratories, Inc. 326 pages, 209 illustrations, 2 tables, 7 appendices, 6 x 9 in., 1925. D. Van Nostrand, New York. $5.

This book is an important addition to the small number of authorities available to the public on the subject of telephone communication. The book is designed as a text book on the subject and is limited to considerations of relative transmission efficiencies of various circuits and problems directly connected therewith. The author tells in a mathematical way the story of the development of communication circuits.

The chapter on Measures of Telephonic Efficiency makes clear the relations of the various terms used. The action of the transformer is taken up in an unusual manner and the treatment is quite involved. The discussion is of great importance since it explains systems of loss comparison and measurement developed through half a century of research and experience. Formulas covering theoretical and practical circuits for substation instruments are worked out in detail.

Characteristics of power and telephone-transmission line problems are contrasted and methods developed for line computations. The theory and design of wave filters is treated in detail. Telephone repeaters, corrective networks, and superimposed circuits are dealt with in separate chapters. Carrier-current telephony is touched upon briefly. Six convenient appendices of mathematical formulas and a complete list of symbols follow the text.

The treatise is a valuable work for the engineer or the technical student, but is not designed for popular reading.

R.B.A.

RELAY HANDBOOK

Prepared by the relay subcommittee of the electrical apparatus committee, Technical National Section, N.E.L.A., with the co-operation of the relay subcommittee of the protective devices committee, A.I.E.E. First edition, 1926. 1,001 pages, 749 illustrations, 55 tables, 4½ x 6½ in., pocket size. National Electric Light Association, N. Y. Price to N.E.L.A. members: 1 copy $4, 10 copies $3.75, 25 copies, $3.50, 50 copies $3.25, 100 copies $3; to non-members 50 per cent higher.

Culminating five years' work on the part of a large staff of men, the Relay Handbook brings to the electrical industry the first comprehensive treatise upon that important subject. Operating experiences of most of the important power systems of the country are combined with descriptive and design data supplied by the manufacturers of that class of equipment.

The handbook presents a ready reference on the subject of protective relays, their design and operating characteristics and the fundamental concepts of their application. The text of the book is divided as follows:

Section	Subject	No. Pages
I	General Information	61
II	Detailed Descriptions of Relays	435
III	Tripping Mechanisms	47
IV	D.C. Systems Protection	89
V	A.C. System Protection	141
VI	Relay Transformers	59
VII	Testing, Maintenance, Records, etc.	91
VIII	Short-Circuit Calculations	77
IX	Bibliography	13

The bibliography is divided under three heads: Relays, Instrument Transformers, and Calculations. These are carried back to 1912, 1908 and 1899, respectively. The book is well illustrated and typical cases are discussed frequently in amplification of the text.

G.R.H.

HOW TO MAKE HIGH-PRESSURE TRANSFORMERS FOR RADIO

By Prof. E. E. Austin, E.E., Hanover, N. H.; 75 pages, 22 illustrations, 5 x 7½ in. Published by the author. $1.25.

This is another of the author's "how-to-make" books. It is designed for the non-technical electrical experimenter who desires to build high-tension transformers for radio transmission. An introduction is given to the terminology, symbols and simple calculations involved. Definite dimensions and information regarding materials and methods are covered for different sizes of transformers.

Personals

J. A. McWilliams has been appointed field representative for the California Electrical Bureau, succeeding **Frank J. Kiefer,** resigned. For twelve years Mr. McWilliams was connected with The Washington Water Power Company, Spokane, and for five years of that time was one of the company's district managers. In 1922 he resigned from

J. A. McWILLIAMS

that position to go to California on account of his wife's health. They located in Fresno, and there he joined the organization of the Valley Electrical Supply Company as range specialist. Later he was made manager of range sales and then sales manager. Mr. McWilliams left the electrical industry to join the staff of the Metropolitan Life Insurance Company in San Francisco but now has returned to the fold.

J. J. Cooper, for twenty-two years associated with the Mountain Electric Company, Denver, has bought out the other interests and is now president. For the last six years Mr. Cooper has been managing head of the company.

J. C. Davidson, manager electrical department, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, recently returned to that city after an extended business trip in the East, which included Camp Merchandise at Association Island and the General Electric Company's factory at Bridgeport, Conn.

Gano R. Baker, formerly affiliated with the industrial division of the San Francisco office of the Westinghouse Electric & Manufacturing Company, has resigned to become sales engineer for the Spencer Elevator Company in that city.

A. A. Blakesley, who has been connected with the Merced Irrigation District for a number of years, has been appointed chief engineer for the district. During the period of construction of the Exchequer Dam **R. V. Meikle,** who was chief engineer for the Turlock Irrigation District, served also in that capacity for the Merced Irrigation District. **M. M. McIntyre,** associated with the Merced project during the greater part of its construction, is to be operating superintendent of the Exchequer power house.

Robert B. Burrows, Pacific Coast manager, Sunbeam Lamp Division, National Electric Lamp Works, was a recent visitor in Denver.

C. W. Wiggins, superintendent of electric production, San Diego Consolidated Gas & Electric Company, has been appointed chairman of the prime movers committee, Pacific Coast Electrical Association.

Al C. Joy, director of publicity, San Joaquin Light & Power Corporation, Fresno, Calif., while in San Diego recently addressed both the San Diego Electric Club and the Advertising Club on "Keeping on Friendly Terms with 75,000 Customers."

A. E. Bacon, manufacturers' agent, and formerly associated with the Mine & Smelter Supply Company, Denver, a short while ago returned to that city from a business trip in the East.

H. G. Ufer, chief inspector for the Underwriters Laboratories, Chicago, lately attended a luncheon meeting of the San Francisco Electrical Development League as the guest of **Claude W. Mitchell,** of the Board of Fire Underwriters of the Pacific.

Harris E. Dexter of New York has been appointed chief of the electrical equipment division of the Department of Commerce. He succeeds **R. A. Lundquist,** who resigned recently to enter private employ. Mr. Dexter has had engineering and sales experience with the General Electric Company and the Boston Edison Company, and more recently has been manager of the Servel Corporation's commercial division.

G. R. Davidson, for six years connected with the publicity department of the B. C. Electric Railway Company, Ltd., Vancouver, recently resigned to enter the financial field. He has been succeeded by **Walter S. Hudson.**

Eugene Logan, for the past nineteen years connected with The Washington Water Power Company, Spokane, has resigned to engage in the general practice of civil engineering in that city. Mr. Logan had been identified with the company's engineering projects, including location of transmission lines and the preliminary surveys and reports on the Kettle Falls and Chelan projects.

E. H. Collins has been appointed acting assistant chief engineer for The Washington Water Power Company, Spokane. **Richard McKay** and **L. R. Gamble** have been named assistant electrical engineers for the same company.

E. E. Scofield, industrial engineer, The Washington Water Power Company, recently returned to Spokane from the East. While there he took a two weeks' course in industrial heating at Mansfield, Ohio, and in addition visited Detroit and Pittsburgh.

G. S. Covey, chairman of the Spokane Section, A.I.E.E., attended the recent annual convention of that organization at White Sulphur Springs, W. Va. While East he also visited Chicago, Washington, Atlantic City and Philadelphia.

R. A. Balzari, formerly manager of the industrial division of the San Francisco office of the Westinghouse Electric & Manufacturing Company, who resigned to accept a position on the counselors' staff of the McGraw-Hill Publishing Company, Inc., New York, has been appointed marketing counselor on the staff of that company's New York district.

E. F. Johnson, manager of the Pacific Gas and Electric Company's Colgate division, recently conducted a party of twenty business men of Marysville, Calif., and adjacent points in that division on a two-day inspection tour of the company's Pit River power plants.

G. H. P. Dellman, of the San Diego Diego Consolidated Gas & Electric Company, was a recent business visitor to Los Angeles.

R. W. Davenport, hydraulic engineer with the Federal Power Commission, was in Salt Lake City recently on an inspection tour for the purpose of familiarizing himself with power projects pending before the commission.

Walter D. Koch, New York and Boston specialty man for the Graybar Electric Company, recently spent several weeks in Denver assisting in the Graybar washer campaign being conducted by the Public Service Company of Colorado.

S. E. Gates, manager of the General Electric Company, Los Angeles, has returned from an extensive trip covering the eastern factories of that company.

C. P. Zimmerer of the auditing department, Electric Bond & Share Company, New York, spent several days in Salt Lake City a short while ago.

Allan G. Jones, assistant sales manager, General Electric Company, San Francisco, returned recently from the company's head offices in Schenectady, N. Y. While East Mr. Jones also attended the department conferences held by the company on Association Island.

D. C. Bertrand, formerly connected with the Great Western Power Company, San Francisco, has resigned to become affiliated with the Electric Equipment & Engineering Company, Aberdeen, Wash.

Frank J. Kiefer, for the past three years field representative for the California Electrical Bureau, has resigned from that organization to accept the

FRANK J. KIEFER

appointment of factory representative for The Armstrong Manufacturing Company, Huntington, W. Va., manufacturers of hardware and electrical specialties. Mr. Kiefer's headquarters will be in San Francisco. Prior to his association with the California Electrical Bureau Mr. Kiefer was connected with the Luthy Storage Battery Company in Hayward, Calif., for two years. For about ten years previous to that he was superintendent of construction for the Pacific Fire Extinguisher Company, San Francisco.

M. Luckiesh, director of the Lighting Research Laboratory, National Lamp Works of the General Electric Company, Nela Park, Cleveland, has had conferred upon him the honorary degree of doctor of science by Iowa State College.

J. M. Perlewitz of the Graybar Electric Company, visited Denver on a business trip a short while ago.

E. K. Hartzell, advertising manager of the western division, Public Service Company of Colorado, has been named chairman of the program committee for the eleventh district convention, International Advertising Association, to be held next February at Greeley, Colo. He is a former president of the Advertising Club of Boulder, Colo.

C. M. McIntosh, Denver representative of the MacBeth-Evans Glass Company, recently made a business trip to Texas.

Clarence Hunt, Pacific Coast representative of Robbins & Myers, was in Los Angeles in the interests of his company the first of the month.

Robert M. Keeney, industrial heating engineer, Connecticut Light & Power Company, Waterbury, Conn., was a recent Pacific Coast visitor.

E. G. MacDonald, assistant superintendent, Alameda Street station, Los Angeles Gas and Electric Corporation, Los Angeles, visited San Francisco not long ago.

W. G. Murrin, vice-president, B. C. Electric Railway Company, Ltd., Vancouver, recently returned from a three months' trip to England.

W. E. Houghton, for many years comptroller of the Los Angeles Gas and Electric Corporation, has been named third vice-president and treasurer of that company, succeeding the late C. A. Luckenbach.

John H. N. Adams, for three years director of publicity for the Chamber of Commerce, San Diego, Calif., recently resigned to become advertising manager of The Mountain States Power Company with headquarters at Tacoma,

JOHN H. N. ADAMS

Wash. While in San Diego Mr. Adams initiated and edited San Diego Business, a monthly magazine, and through his efforts more than 30,000 ft. of motion picture news reels were filmed there. Prior to taking up his residence in San Diego, Mr. Adams was with two of the larger motion picture organizations in New York, where he received his training and experience in promotional work. He is a native of New York City, and obtained his education in New Jersey schools.

I. J. Kauffman, general manager, Square D Company, Detroit, accompanied by Mrs. Kauffman, recently made a combined business and pleasure tour of the Pacific Coast.

Ivan DeJongh, of the Delco Light Company, Los Angeles, recently returned from an extensive eastern business trip.

Ray W. Murphy, Pacific Coast manager, Westinghouse Lamp Company, with headquarters in San Francisco, recently made a tour of the Northwest territory.

J. P. Fairbank, extension specialist in agricultural engineering, University of California, Davis, recently stopped for a brief time in San Francisco en route to the National Lamp Works of the General Electric Company at Nela Park, Cleveland. He was going to participate in the lighting course being given there and also to visit various farm equipment plants to learn what new applications may be used in rural electrification.

L. M. Cargo, district manager Westinghouse Electric & Manufacturing Company with headquarters in Denver, recently completed a two weeks' business trip in the territory about Salt Lake City.

A. Emory Wishon, vice-president and general manager, San Joaquin Light & Power Corporation, Fresno, paid a brief visit to San Francisco a short time ago.

Victor W. Hartley, secretary, California Electrical Bureau, San Francisco, while in Los Angeles a short time ago paid a visit to the Electric Club and approved its plan of holding club meetings during the summer.

W. A. White, New York, chairman of the board of directors, The Washington Water Power Company, recently had conferred upon him the honorary degree of doctor of letters by Princeton University. Mr. White has had a lifelong interest in literature and for more than forty years has been a collector of books.

D. E. Harris, president, Pacific States Electric Company, has returned from Bridgeport, Conn., and other Eastern cities where he conferred with officials of the General Electric Company in reference to the new building about to be erected in San Francisco for the former company.

George A. Campbell, general manager, Truckee River Power Company, Reno, Nev., not long ago made a trip to San Francisco.

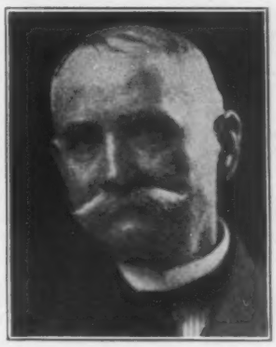
Obituary

Olaf Olson, veteran tunnel builder, who had driven numerous tunnels in connection with hydroelectric power projects and irrigation developments throughout the Northwest, recently was killed by a fall through an open window. Mr. Olson drove the tunnel from Alouette to Stave Lake for the B. C. Electric Railway Company, Ltd.

A. Wellington Hillis, secretary and treasurer, Electrical Products Company, Detroit, died recently in that city. From 1905 until the beginning of the World War he was connected with the Western Electric Company.

Frederick J. W. Luck, for many years prominent in the engineering counsels of the Westinghouse Electric International Company in various countries, died in London, July 12. He was a fellow of the American Institute of Electrical Engineers.

Charles Albert Coffin, president of the General Electric Company from its organization until 1913 and chairman



CHARLES ALBERT COFFIN

of its board from then until his retirement in 1922, died July 14 at his home at Locust Valley, Long Island, N. Y., at the age of 81. He is credited with having done more to create and stabilize the electrical industry than any other man or group of men. A shoe manufacturer in Massachusetts prior to 1881, he purchased at that time, with others, the Thomson-Houston Electric Company, New Britain, Conn. He was active in the management of this pioneer electrical manufacturing company and extended the scope of its operations until finally he organized the Thomson-Houston International Electric Company to act as agent of the American company in foreign lands. In 1892 he succeeded in merging the Thomson-Houston company with the Edison General Electric Company into the General Electric Company, of which he became president. After his retirement from active work in the company, the directors of the General Electric Company, alluding to him as the inspiration and leader of that company for thirty years, established the Charles A. Coffin Foundation "as an expression of appreciation of Mr. Coffin's great work not only for the General Electric Company but also for the entire electrical industry. . . ." This is a fund of $400,000, the income from which is used for "encouraging and rewarding service in the electrical field. . . ." Under this foundation a gold medal is awarded annually to the electric light and power company adjudged to have made the most distinguished contribution to the general advancement of the electrical industry during the year. Mr. Coffin distinguished himself during the war early in 1915, by organizing the War Relief Clearing House for France and her allies, which later was consolidated with the American Red Cross. He was active in the war work of the American Red Cross throughout the war and was decorated as an Officer of the Legion of Honor of France; made a Commander of the Order of Leopold II of Belgium; and elected to the Order of St. Sava, of Serbia. Mr. Coffin is survived by a widow and three children.

TRADE NOTES

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., has changed its name and now will be known as the **Leonard Refrigerator Company.** The change follows the merger of the Kelvinator, Leonard and Nizer organizations. **Henry W. Burritt** has been elected president of the new company.

Barrett, Haentjens & Company, Hazleton, Pa., have issued a new 24-page booklet on automatic pumping. The subject is covered in detail and is illustrated by several drawings.

General Engineering & Supply Company, New York City, has developed a new machine which serves to mark bayonet bases for miniature and automobile lamps and simultaneously tests the bulb. It is foot-operated and capable of a production of 10,000 lamps per day. The machine is adapted to test single or doublt-contact lamps as well as double-circuit lamps as used in automobile headlights.

Curtis Lighting, Inc., Chicago, now has available a complete color equipment for its X-Ray reflectors, Nos. 400, 410, 500 and 510, known as "Jack," "Jill," "King" and "Queen." These color-ray units follow the same general shape as the rims of the reflectors. They may be used when the reflectors are recessed with X-Ray cast ceiling flanges as well as when they are attached to conduits or channels in the usual manner. The new color-ray is particularly adapted for show-window lighting and a variety of startling and beautiful effects now can be obtained easily, according to the company.

Schweitzer & Conrad, Inc., Chicago, has issued a folder descriptive and illustrative of its Pantograph air break switch. Many new, novel and valuable operating features, which are distinct improvements over all high-voltage switches, are claimed for the device.

The Absolute Contactor Company, Beloit, Wis., has let the contract for the construction of its new fireproof factory building at Elkhart, Ind. Greatly increased plant facilities will enable the company to take care of its rapidly expanding business.

Williams Gauge Company, Pittsburgh, has developed a new stream line pump valve, which it is claimed embodies all the features that are essential to maximum efficiency. It is exceedingly strong and sturdy, made along simple lines, having but four parts. To assure sensitivity it is made as light as possible so that its action is instantaneous and leakage troubles are eliminated.

General Electric Company, Schenectady, N. Y., describes and illustrates its various types of switchboards in its recent folder No. 135. Advantageous features are pointed out, and the photographs in the folder show minute details of design. Leaflet No. 399 describes a.c. switchboards with oil circuit breakers. These switchboards are applicable to small generating stations and substations in which it is desirable to keep the equipment cost as low as possible.

Pass & Seymour, Inc., Syracuse, N. Y., have placed on the market a thin type of canopy switch with an especially short body and narrow width. It is designed with parallel wires running straight from the switch body without bend or break. The wires are 6 in., No. 18 stranded new code wire, with a special cover that prevents defacing the walls during installation. The ends of the wires are stripped one inch for quick wiring.

Century Electric Company, St. Louis, has issued a folder on stator construction and field windings, squirrel-cage induction polyphase motors. Photographs of the motor and parts are given.

No, the long gentleman caught by the camera apparently peering hopefully into the depths of the large container is not a candidate for Mr. Volstead's wrath. He is Tom Wood, president of the Seattle Electric Club and winner of the Henry J. Martin Trophy in the club's annual golf tournament last year, and he is looking his last at the cup which this year he lost to J. J. Agutter. Note the now-look-what-you-went-and-done expression of Harry Martin, donor of the prize.

Killark Electric Manufacturing Company, St. Louis, has placed on the market a new bell-ringing transformer which is used as a cover for a 3-in. or 4-in. outlet box so that the primary wires may be brought to the transformer in conduit. It is known under the trade name of "Grey Bell" and is made for 110 volts, 60 cycles, and furnishes 8 volts on the secondary side for ringing door bells.

The Triumph Electric Corporation has been organized to take over the good will, design, records, patent rights and inventions of the Triumph Electric Company. The new company will specialize on its TR self-start automatic heavy-duty motor and at the same time be in a position to supply its other lines of electric and refrigerating products.

Standard Electric Stove Company, Toledo, Ohio, has produced a new urn heater under No. 3,000. It is made in two wattages, 1,000 and 1,500, each controlled by a three-heat switch. This heater is an addition to the company's line of complete electrically equipped coffee urns and immersion urn heaters shown in its catalog No. 15.

The Cutler-Hammer Manufacturing Company, Milwaukee, has produced a new device for the accurate measurement of gas flow. It is called the Cutler-Hammer Thomas meter and is made in sizes capable of measuring from 2,500 cu.ft. up to 200,000 cu.ft. per hour. It is extremely simple to wire, to operate an dto maintain, the company claims.

Wholesale Electric Company, of San Francisco and Stockton, has announced its consolidation with the Stewart Electric Company of Los Angeles, whose business in the future will be operated under the name of the Wholesale Electric Company. **A. R. Fierce** is president of the concern, and **E. A. Stewart** will maintain active participation in the Los Angeles branch.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued a 23-page booklet dealing with electrical equipment for heating and ventilating systems. Nine full-page engravings depicting some of the country's leading hotels, department stores, clubs and office buildings wherein Westinghouse electrical heating has been installed are shown in the booklet. Photographs of the various types of motors also are shown.

The Quadrangle Corporation, New York City, now is marketing a tool called "Quandrangle" for cutting outlet holes in plaster and wood. This tool can be used with an electric drill or with a hand brace. When the electric drill is used, a clean-cut hole is cut in less than a minute. With a hand brace it requires about three minutes. The cutting is done by four saws made especially for this tool. For plaster walls the holes are so arranged that screws inserted in two of the three holes provided are bound to catch the laths.

The Timken Roller Bearing Company, Canton, Ohio, is contemplating spending $1,50,000 in expanding the Canton plant of the company. Building plans have been completed and the new units are to be finished by Jan. 1, 1927. At present the company claims to have the largest output of electric furnace steel in the world.

Ingersoll-Rand Company, New York, has issued a 21-page booklet on marine oil engines for direct and electric drive. Full-page photographs showing installations in the engine rooms are given in the booklet as well as actual photographs featuring the single-acting, direct-injection, 4-cycle engine for direct-connected and electric-driven motorships. Copies of the booklet can be had by addressing the company.

The Kuhlman Electric Company, Bay City, Mich., has established a factory office in the General Motors Building, Detroit, Mich. **Richard P. Johnson** will have charge of the office.

Economy Fuse & Manufacturing Company, Chicago, has issued a small folder containing price lists and descriptions of its renewable fuses. **Western Electric Company** are distributors for this fuse in the principal cities in the United States.